Public Perceptions of Mountain Pine Beetle Management Alternatives

Meitner, Mike; Berheide, Daniel; Nelson, John; Sheppard, Stephen

Mountain Pine Beetle Working Paper 2008-06

Natural Resources Canada, Canadian Forest Service,
Pacific Forestry Centre, 506 West Burnside Road, Victoria, BC V8Z 1M5
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MPB Project # 8.16

Department of Forest Resources Management

University of British Columbia.

2045-2424 Main Mall

Vancouver, BC., Canada V6T 1Z4

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Abstract

Modern forest visualization techniques have proven invaluable to forest managers by making it possible to visually represent alternative management scenarios that are otherwise only represented by abstract statistics. In this project we have developed the technical capacity to extend current techniques used for the increasingly automated generation of near photo realistic imagery representing proposed landscape level change to the case of the current mountain pine beetle epidemic. These visualizations were then used in a series of structured perceptual experiments aimed at increasing our understanding of the social dimensions affecting the acceptability of management actions. Specifically, the following were investigated: issues of the public acceptability of possible management alternatives; public beliefs of the origins of this event and how those belief frame appropriate management goals post event; and perceptions of impacts and associated mitigation strategies on non-timber and non-market values including aesthetics and recreation potential. The major findings of this study, apart from the technical capacity that was built were: 1) respondents clearly support increased salvage logging; 2) little seems to be known about the specifics of what is being done to manage the effects of the mountain pine beetle; and 3) replanting harvested areas with mixed species is the most preferred alternative of those presented. While the Prince George and Kelowna samples responded similarly in most cases, Prince George participants felt that they were more at risk as a community whereas participants in Kelowna had a greater degree of optimism about their community's ability to weather the storm.

Keywords: mountain pine beetle, forest visualization, public perception, salvage logging

Résumé

Les techniques modernes de visualisation des forêts se sont révélées inestimables pour les aménagistes forestiers en permettant à ces derniers de représenter visuellement les différents scénarios de gestion qui sont autrement représentés à l'aide de statistiques abstraites. Dans le cadre du présent projet, nous avons développé la capacité technique de pousser plus loin les techniques actuellement utilisées pour la production de plus en plus automatisée d'images d'une qualité quasi photographique qui représentent les changements proposés à l'échelle du paysage au cas actuel d'infestation de dendroctone du pin. Ces représentations visuelles ont été ensuite utilisées dans une série d'expériences structurées sur la perception qui nous aident à mieux comprendre les dimensions sociales liées à l'acceptabilité de telles mesures d'aménagement. On a ainsi étudié les questions suivantes : l'acceptabilité auprès du public des différentes options d'aménagement possibles, les croyances entretenues par le public quant à l'origine de cette infestation et la façon dont ces croyances servent de cadre aux buts considérés appropriés pour l'aménagement forestier après l'infestation, ainsi que les perceptions des effets et des stratégies d'atténuation qui leur sont associées sur les valeurs non marchandes et sur les valeurs autres que le bois, notamment l'aspect esthétique et le potentiel récréatif. Outre le développement de notre capacité technique, l'étude a produit les principaux résultats suivants : 1) Les répondants sont clairement favorables à une réexploitation accrue; 2) Le public semble savoir peu de choses sur les mesures particulières prises pour gérer les

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1 Introduction

The objectives of this project were twofold. First, we set out to build the capacity to visualize natural disturbances common in British Columbia (BC) with specific emphasis on creating the ability to represent possible forest futures related to the mountain pine beetle epidemic. The second objective was to utilize this new found technical ability to create scenario visualizations of possible management trajectories to be used in public perception research to investigate a number of research questions. Specifically, we set out to investigate the public acceptability of possible management alternatives. These alternatives were depicted as visualizations as well as by information regarding the specifics of each scenario. Participants were asked to weight several factors when rating these scenarios including: 1) how long until the beetle-damaged forest has recovered to a harvestable state, 2) the risk of the outbreak happening again, 3) the cost of the scenario, 4) the ecological effects of the scenario, 5) the resulting scenic beauty and 6) the potential of the area to support outdoor recreational activities. Additionally, we set out to determine public beliefs of the origins of this event and how those beliefs frame appropriate management goals post event as well as perceptions of impacts and associated mitigation strategies on non-timber and non-market values. The underlying rationale for this work was to understand the general (and affected) publics' conceptions of the current mountain pine beetle epidemic and thus to solicit input that may be useful to policy makers grappling with finding solutions to ease the burden imposed on affected communities.

This is especially important in light of the scale of the current outbreak, which is now estimated to have killed 9.2 million hectares of BC forests and represents nearly 582 million cubic metres of timber (British Columbia Ministry of Forests 2006a). However, the real impacts of this epidemic are far greater than the simple effects on timber supply, even though alone this would constitute a clear and present danger to the province and its citizens (British Columbia Ministry of Forests 2006b). People's surroundings are being transformed into vast seas of dead and dying trees. The effects on recreation, tourism, and human health are largely unaccounted for. Many of these dimensions depend on the scenic qualities of the environment and as such maps and graphs depicting the course that the outbreak will take and the paths that we may travel to recover from this are inadequate. This research has developed the ability to, with near-photo realism, represent how the landscape will change in terms that everyone can relate to and understand with little effort. By adding these visualizations to a standard survey instrument we are able to address these issues while gauging public perception of this event.

2 Material and Methods

2.1 Viewpoints

Four viewpoints were selected to be visualized. Viewpoint 1 was a pine dominated landscape whereas viewpoint 2 represented a more mixed species environment. For illustration purposes each color represented a different forest stand type.

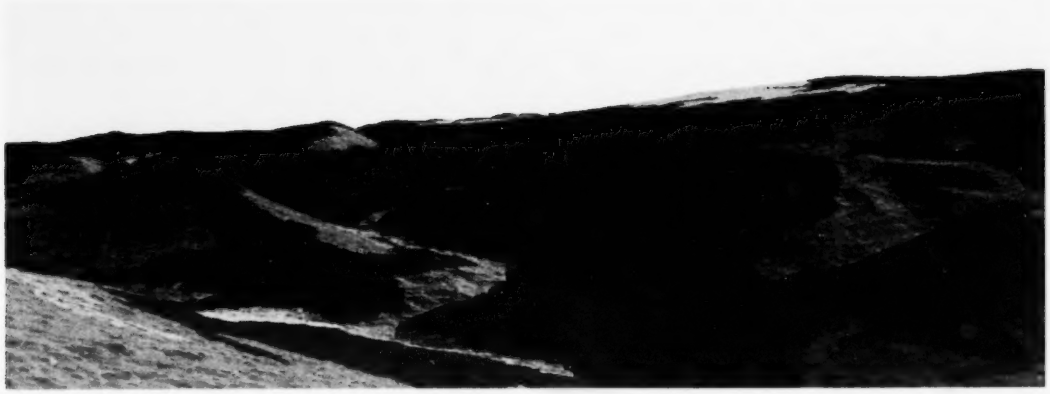

Figure 1: Pine dominated landscape (viewpoint 1)

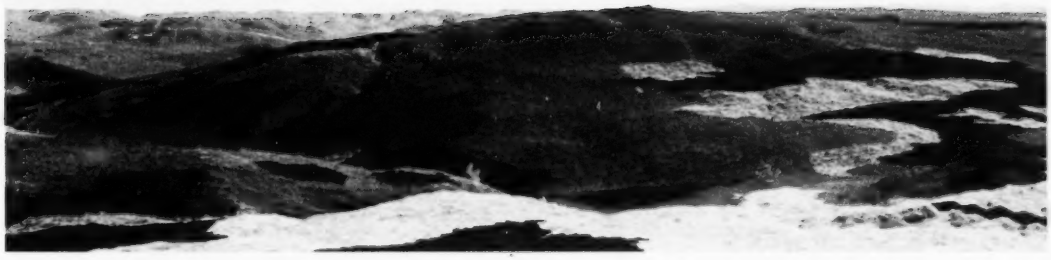

Figure 2: Mixed species landscape (viewpoint 2)

Both viewpoints were of sufficiently large areas to allow for a comprehensive overview of the areas being visualized, but were shot from angles that are very close to the ground such that they would be representative of views people might have in the area if they were to drive through it. Viewpoints 3 and 4 were created to show the details of the proposed scenarios and are as such much smaller in scale.

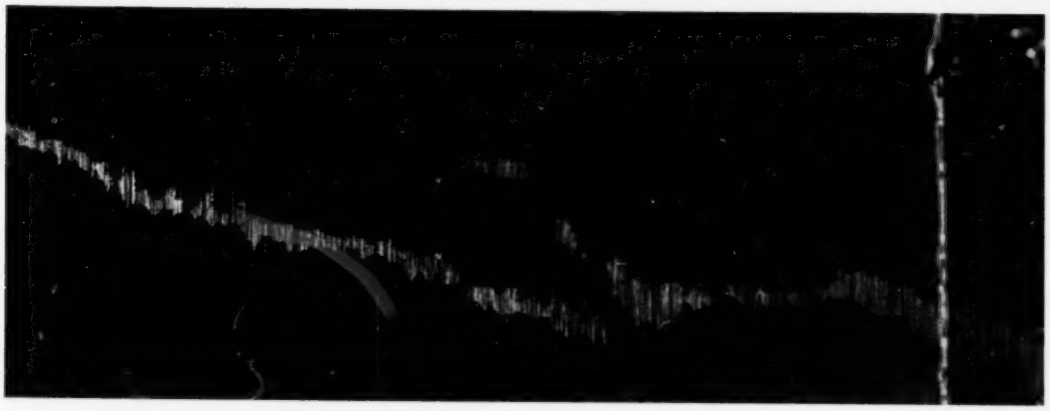

Figure 3: Midrange view (viewpoint 3)

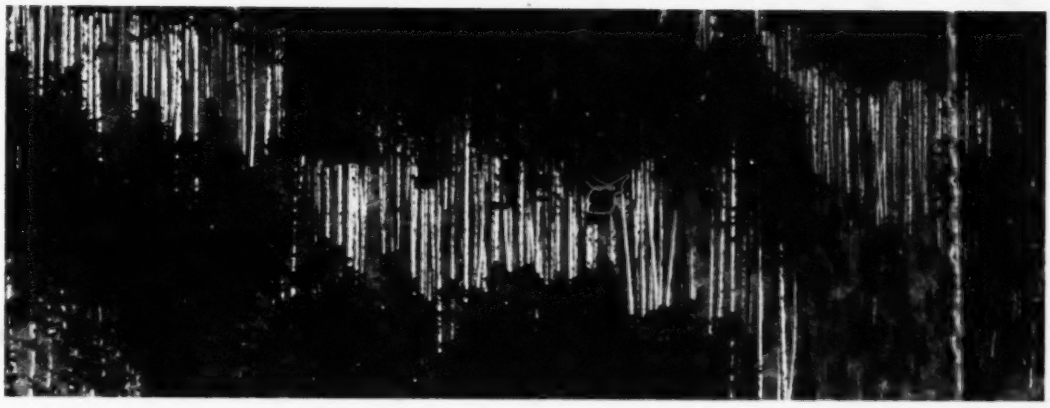

Figure 4: Detail view (viewpoint 4)

2.2 Management scenario development and detailed specification

Based on a great deal of consultation with forest experts, four scenarios were established. Recovery scenarios are as follows:

1) Do nothing: Baseline with no harvesting. Everything regenerates naturally according to whether it is a pure pine stand or a mixed stand.
2) Harvesting: Harvest areas according to Tolko Industries Ltd.'s most likely scenario. All areas are assumed to be clearcut. Harvested areas will be regenerated in three different ways:
    a. No fertilization after clearcutting, replant with pure pine;
    b. No fertilization after clearcutting, replant with mixed;
    c. Fertilize after clearcutting, replant with pure pine.

In the survey these were described in the following manner:

Scenario 1 - Do nothing (*refer to image set 1*)
In this scenario everything regenerates naturally according to whether it is a pure pine stand or a mixed stand. No trees are harvested and no treatments of any kind are applied to the forest. This scenario can be used as a baseline to compare the effects of the other scenarios against. The estimates of recovery time for this scenario range from 75-100 years.

Scenario 2 - Replant with pure pine (*refer to image set 2*)
Timber is harvested in this scenario and each area harvested is replanted. In this scenario pure pine is planted similar to the original composition of the existing forest. The estimates of recovery time for this scenario range from 65-75 years.

Scenario 3 - Replant with mixed species (*refer to image set 3*)
Timber is harvested in this scenario and each area harvested is replanted. In this scenario mixed species of trees are planted in an attempt to reduce the risk of future outbreaks. The estimates of recovery time for this scenario range from 70-80 years.

Scenario 4 - Replant with pure pine (fertilized) (*refer to image set 4*)
Timber is harvested in this scenario and each area harvested is replanted. In this scenario pure pine is planted similar to the original composition of the existing forest. In this case the trees are fertilized to help them to grow more quickly. The estimates of recovery time for this scenario range from 60-70 years.

A total of 176 images were rendered to represent the four scenarios (44 per scenario). Each scenario was visualized from each of the four viewpoints previously described. For each viewpoint, 11 time steps were rendered: years 0, 1, 2, 3, 4, 5, 10, 20, 40, 60, and 80. These time steps were chosen to both depict short term and long term changes in the forested landscape and were rendered in an 8 x 3 aspect ratio.

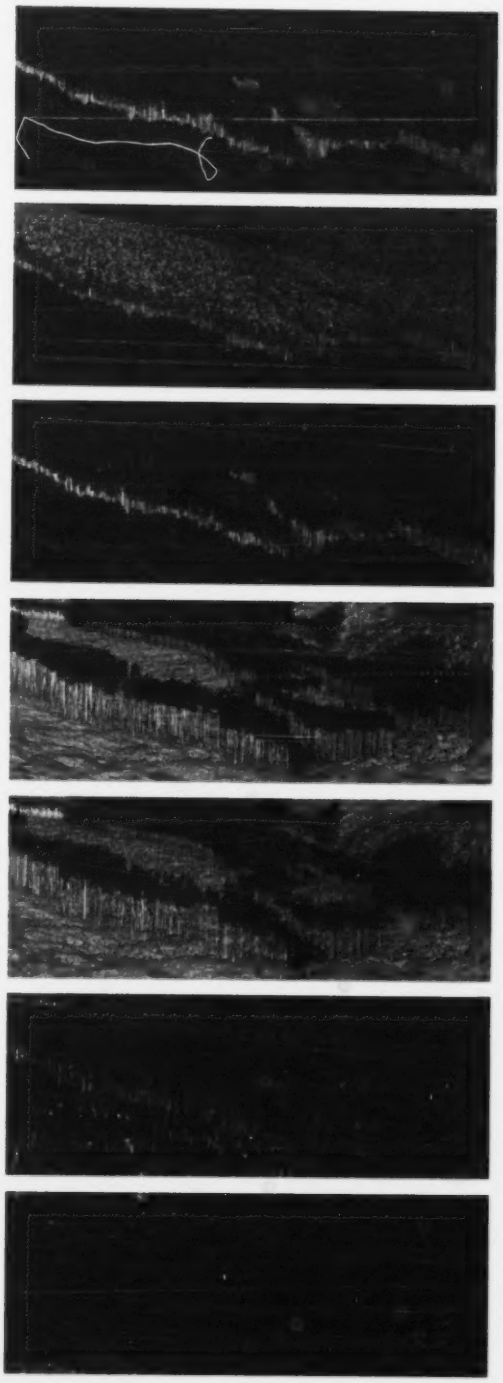

Figure 5: Sample temporal progression, scenario 2b

2.3 Survey Methods

Phase 3 of this project consisted of a survey of public opinion about mountain pine beetle (MPB) management alternatives. To measure public opinion, we developed a structured questionnaire with several open-ended questions. This study uses a 71-item self-administered questionnaire (see Appendix C) to collect information on a range of values, knowledge, and perceptions related to mountain pine beetle management strategies. To ensure the quality of the design and the validity and reliability of the questionnaire items, the survey was piloted on a sample of approximately 50 Kelowna residents shopping at Wal-MART on Wednesday, December 6th 2006.

Drawing on data collected in the previous two phases of the project, a visualization component is included to solicit the public's reaction to what forests look like in the present and in the future under different MPB management scenarios. These visualizations allow us to measure the public's aesthetic preferences. The mix of closed, open-ended, and visualization items is unique and provides a variety of measures of the public's perceptions. Subjective views about the mountain pine beetle outbreak provide important information for the policy making process. This study seeks to gain a better understanding of the social determinants of public support for mountain pine beetle management alternatives.

First, this study presents management alternatives side by side to derive scaled forced-choice data. Subjects are asked to view all management alternatives simultaneously (displayed in a matrix of scenarios depicting proposed changes by time). This approach allows us to determine both aggregate management alternatives preferences as well as individual differences (survey participants compared scenario projections over 80 years as opposed to judging management alternatives based on either the first 5-20 years or the 'end-result' appearances in 80 years) that might explain aggregate judgments.

Second, before conducting the visual choice experiment, we first administer a pre-test survey to measure attitudes about the current mountain pine beetle epidemic, social actors, wider environmental and economic interests, and demographic information. This survey also addresses individual beliefs about the causal factors behind the MPB outbreak and how people understand the role of humans in contributing to this situation. Upon completing the management preference ranking in this survey, subjects are asked to rank the computer-generated image sets for their degree of perceived *scenic beauty*. This portion of the experiment yields the perceptual ratings used in quantitatively assessing the relationships between bio-physical features associated with alternative post-MPB treatments and their associated public perceptions. These data provide a baseline understanding of the major biophysical levers on these aspects of public perception of post-MPB management alternatives. In addition, in the post-test part of the survey, participants were again asked to provide the degree to which they support harvesting 'damaged wood' to explore whether their support for this strategy may have changed based on the experimental task of assessing their visual preferences for management alternatives.

Finally, in this study we compile trade-off information for temporal flow of aesthetic, recreational, ecological and economic values associated with alternative management scenarios. Aesthetic information is derived from questions on the importance of *scenic beauty* as a component in ranking management scenarios and compared with a separate

ranking of the scenarios independent of management considerations and only based on *scenic beauty*.

2.3.1 Data Collection

This research has focused on two communities currently affected by the MPB, specifically Kelowna and Prince George. The unit of analysis is individual residents of these two affected areas in BC. Ethical considerations in the design of the survey are guided by the principle that participation in the study should be both voluntary and no harm should come to its subjects. Following ethical guidelines, both comprehensive liability insurance and honorariums along with guarantees of anonymity and confidentiality are used. All subjects have provided informed consent.

2.3.2 Population and Sample

The pilot test shows that a 'convenience' sampling method produced a diverse cross-section of public opinion. For practical reasons, a convenience sample seems the best approach for gathering data quickly and inexpensively in the target communities. The survey has been administered to a non-probability sample of English speaking individuals over the age of 18 self-selected from communities in Prince George and Kelowna. The sample consists of 159 individuals in Prince George and 153 in Kelowna for a total sample of 312 individuals (see Table 1). The data were collected January 19th through the 21st 2007 at the Capri Centre Mall in Kelowna and February 10 and 11th 2007 at Wal-MART in Prince George.

The sampling method requires participants to have the means and a motive to go to either Wal-MART or the Capri Centre Mall on the days the questionnaire was administered. There is a risk of sampling bias given our reliance on available subjects. Those who completed the survey may represent people who shop at the mall or Wal-MART with greater frequency than others. The data may not be entirely representative of the views of the public at large. The study population, therefore, refers specifically to the adult residents of Kelowna and Prince George shopping at Wal-MART and Capri Centre Mall.

The *Prince George* sample is approximately 60% female and 40% male (see Table 2). Over half of the sample (57%) is married (see Table 3). Over a third (37%) has one or more children under the age of 18 living at home (see Table 4). Almost one-quarter (23%) report working in education and health services, 12% wholesale and retail, and 7% work in natural resources and mining industries (see Table 5). Overall, 70% have received some form of education beyond high school: 21% completed high school, 45% have had either some college or received an advanced certificate, and 25% of the sample received a Bachelor degree or higher (see Table 6). The modal Prince George respondent is female, age 39 (see Table 8), married, and works in education and health services.

The *Kelowna* sample is approximately 60% male and 40% female (see Table 2). Over a third of the sample (39%) has never married (see Table 3). Approximately one-quarter have one or more children under the age of 18 at home (see Table 4). Almost one-quarter (22%) work construction, 18% are in education and health services, 10% in leisure and hospitality and 8% are in natural resources and mining (see Table 5). Approximately 60% received education after completing high school: 40% completed high school, over 30% received some college or received a certificate, and almost 20% received a Bachelor degree

or higher (see Table 6). The modal Kelowna respondent is 47 years old (see Table 8), male, single, and works construction.

The *aggregate* sample is equally divided between men and women (see Table 2). A little over a third (36%) has never married (see Table 3). Over two-thirds (69%) of the sample have no children under the age of 18 living at home (see Table 4). Slightly less than one-quarter (22%) are employed in education and health services sector, 14% work construction, and 8% are in natural resources and mining (see Table 5). Two-thirds (65%) of the sample received education beyond high school: 21% completed high school, 43% received some college or a certificate, and a little less than one-quarter (22%) completed a Bachelor degree or higher (see Table 6). Almost half of the sample reported earning less than $30,000 last year (see Table 7). The modal respondent is 43 years old (see Table 8), married, and works in education and health services. These demographic characteristics suggest that the sample has sufficient diversity on a variety of dimensions to give us confidence that we have measured much if not all of the range of public opinion on the MPB issue.

2.3.3 Limitations

Given limitations in time and resources, a convenience sampling method allowed the researchers to gather data efficiently. The sampling method chosen allowed us to catch people out in public to both gather data and increase awareness of the MPB issue. Although limitations to our survey design preclude us from being able to generalize statistically to adults in BC, we are able to provide a general description of public perceptions of the mountain pine beetle outbreak.

3 Results and Discussion

3.1 Knowledge and beliefs about mountain pine beetle ecology and mountain pine beetle management alternatives

The mountain pine beetle threatens to destroy huge tracts of BC forests, including areas around Kelowna and Prince George, and yet a majority of the respondents from both communities indicate that they know little or nothing about the MPB outbreak in the province (see Table 9). Residents in Prince George generally report knowing more than their counterparts in Kelowna. Almost half (48%) of the sample from Prince George say they know 'a fair amount' to 'a good deal' about the MPB outbreak while not even a third (31%) of the residents in Kelowna know that much. Residents of both communities report knowing even less about the management of the mountain pine beetle in their area; 81% know 'nothing' to 'a little' in Kelowna while 74% report knowing 'nothing' to 'a little' in Prince George (see Table 10). Lack of knowledge may hamper the public's ability to make choices concerning which management alternatives to support. This finding has wide ranging implications. Specifically, efforts to inform the general public regarding the details of management actions being employed to mitigate damage, recover fibre and speed the recovery of these forested lands has largely been ineffective. While a greater percentage of respondents report higher levels of general knowledge, there is also room for improvement. Based on these results, these efforts would be best focused on communities currently experiencing less direct current impact.

3.2 Support for Harvesting

The questionnaire contained five different close-ended items measuring respondents' support for harvesting trees as a means of managing the mountain pine beetle outbreak. Only one of these items allowed respondents to answer 'can't make an informed decision.' Over one-fifth of the respondents chose 'can't make an informed decision' (22% from Kelowna and 17% from Prince George), when participants were asked if they "would support policies to increase the degree of salvaging timber now to remove more affected trees," signalling perhaps the public's lack of awareness about the economic consequences of forest activities as well as their lack of confidence that they can make a decision about forestry practices based primarily (or solely) on economics (see Table 11). In contrast only 6% responded 'don't know' when asked whether they agreed or disagreed that "harvesting should be increased in infected areas to salvage larger volumes of timber" (see Table 12) and none responded 'don't know' when asked whether they agreed or disagreed that "timber extraction should be reduced to ensure a sustainable level of harvesting." (see Table 13) It may be that the substantially higher level indicating that they could not make an informed decision on the earlier question resulted from the use of the word "informed." Or it could have been because the question was presented in a longer and more complex way:

> "It has been argued that salvaging more pine now will allow the forest to recover faster, get the most value from the timber resource, and employ more people in the short term. However, increased salvaging now will likely result in the elimination of many jobs in the future (15-20 years) after all of the affected pine has been cut and there is no more available mature pine to harvest. Additionally, unless other techniques can create diversity in the ages of the trees planted after salvaging, another MPB epidemic may occur. Would you support policies to increase the degree of salvaging timber now to remove more affected trees?"

While there was some ambiguity of response based on how the question was answered there was an overwhelming pattern of response in favour of increased salvage logging. Of survey respondents, 51.6% suggest that increased salvage logging is preferred (see Table 11) and 67.9% 'agree' or 'strongly agree' that they support increase harvesting of affected trees. However, this needs to be balanced with the fact that, without any mention of the MPB, approximately 40% agreed "Timber extraction should be reduced to ensure a sustainable level of harvesting." In light of this it seems that the survey population did not simply agree that more logging is desirable in all cases, in fact they seem to prefer reduced levels of logging over all; however, when beetle-killed trees are involved, respondents tended to support increased logging.

Respondents were also offered 'can't make an informed decision' as an answer choice when asked whether they "prefer reforestation to occur without the use of genetically engineered species." As Table 14 shows, nearly one-fifth answer 'can't make an informed decision' (16% from Kelowna and 21% from Prince George). In addition, no clear pattern of results is evident in the data, painting the picture that in terms of the public's support for genetically engineered reforestation, reactions are mixed, with 28.9% stating that they distrust this in any case, 24.8% stating that in the case of recovery from the MPB they would support it, while 28.0% agree that it would be appropriate at any time.

3.3 Mountain pine beetle alternatives

The only other items with high levels of 'don't know' responses were the questions on the BC Action Plan, First Nations, and Biofuel. One-fifth (25% from Kelowna and 18% from Prince George) do not know either what the BC Mountain Pine Beetle Action Plan is or whether the government consulted the community (see Table 15). As Table 16 shows, when asked to agree or disagree with the statement "First Nations values are being considered in MPB management strategies," approximately one-third responded 'don't know' (37% from Kelowna and 29% from Prince George). According to Table 17, 17% of participants responded 'don't know' (14% from Kelowna and 20% from Prince George) when asked to agree or disagree with the statement "I would support the development of a biofuel processing plant in the local area." These results suggest that a sizable minority of residents in MPB-affected areas do not feel that they have sufficient information to choose among management alternatives ranging from harvesting to biofuel projects.

The survey not only asked respondents about MPB management alternatives, it also asked them some questions about their knowledge and beliefs about the origins and nature of the MPB outbreak. Almost all the respondents believe that humans are at least partly to blame for the MPB outbreak (see Table 18). Almost two thirds (64%) agree that the MPB is a natural part of forest ecology (see Table 19). Almost as many (61%) disagree that the forest will never recover (see Table 19). A little over half (56%) disagree, though, that forests will adapt to the MPB suggesting that the recovery, like the outbreak itself, will require human intervention (see Table 19).

3.4 Scenario Evaluations

In both samples, the mean scores indicate preferences for management scenarios ranked as:

1. Replant with Mixed Species
2. Replant with Pure Pine
3. Replant with Fertilized Pine
4. Do Nothing.

Scenario 2 and 4 share similar support except that almost one third (31%) indicate that replanting with fertilized pine is the post-MPB strategy they prefer the least. A separate question asks participants to consider the use of fertilization and 38% respond that they cannot make an informed decision about whether they would support the use of fertilization. Another 39% would support the use of fertilization "to assist faster regrowth of stands" while 22% indicate that they would not. Policy makers need to be aware, therefore, that some citizens, albeit a minority, object to using fertilizer. Some respondents asked if the fertilizer would be 'organic, non-chemical'; others indicated that they object to the use of fertilizer under any circumstances. A comparison of the means indicates residents of Kelowna prefer replanting with fertilized pine as much as they do with pure pine, while residents of Prince George markedly prefer replanting with pure pine over fertilized pine.

3.5 Factors in Decision-making

The aggregate mean scores show that ecological effects (3.94) was the most important factor in determining individuals' preferences, followed by risk of future outbreaks (3.83), scenic beauty (3.13), recovery time (3.01), potential for outdoor recreation (2.90), then

lastly cost (2.66). Almost one-fifth (19%) indicated cost was not an important factor influencing their preferences towards management scenarios. Although ratings for each sample were generally similar, the means show cost is slightly more important to residents of Prince George than Kelowna.

Although almost half of the respondents would "support policies to increase the degree of salvaging timber now to remove more affected trees" even if salvaging now would result in job losses 20 years from now, individuals in Prince George seem a little more reluctant than survey participants in Kelowna. In addition, 56% of respondents disagree to strongly disagree with the statement that "The BC government consulted the community sufficiently in the creation of 'British Columbia's Mountain Pine Beetle Action Plan 2005-2010'." Seventy percent support harvesting 'damaged wood'. Responses from Prince George (70% of the sample) echo the sentiment previously reported in Kelowna (66%), that government (opposed to private citizens or industry) should be "held primarily accountable for managing the MPB and its consequences."

Over one-third of the sample viewed the extent of the MPB outbreak as both a product of natural disturbance ecology and warming temperatures and over 40% responded that humans are little, more, or largely to blame for the recent outbreak of the MPB. There appears to be a growing consensus that the extent of the mountain pine beetle is a representation of human-induced ecological change.

While a fifth of the Prince George sample disagrees, 58% agree to strongly agree that BC Wood products will decrease in value as a result of the MPB. Similarly, 70% agree to strongly agree that they will feel the economic consequences of decreases in market value of wood products. Prince George appears generally more concerned about the economic impact than Kelowna with half of the Prince George sample disagreeing to strongly disagreeing that the "local economy is strong enough to hold out through a shortage of logging activity." In contrast, half the Kelowna sample agrees their economy is strong enough to endure a shortage of logging activity. Ecological concerns explain general support for policies to increase harvesting. Particular issues such as aesthetics, First Nations, fertilization, economic security, etc. need to be addressed to enjoy wide community support. There was a high degree of concern for risks of future outbreaks, along with generally high levels of environmental concern.

4 Conclusions

Whether as a result of heightened perceptions of the ecological and economic risks associated with the mountain pine beetle or innate aesthetic predisposition towards variety in forest composition, preferences for replanting treated areas with mixed species is apparent in the survey. Examining the tradeoffs associated with management alternatives illustrates the degree to which ecological concerns and understanding shape public acceptance of mountain pine beetle management strategies. The results show individual support for increased harvesting may be correlated with the heightened perceptions of ecological and economic risk associated with the mountain pine beetle outbreak. Also, not surprisingly, the extent to which the outbreak is perceived as impacting the ecology and the economy more in Prince George than Kelowna is evidenced in the results.

The level of general knowledge in these communities about the mountain pine beetle is quite good, but significant improvements in communication regarding the specifics of management and the varied effects this might have on affected communities can be realized. While the respondents from Prince George and Kelowna agreed on many of the research questions, there were a few interesting differences. Overall, people in Prince George felt they were better informed, either by direct exposure, media coverage or outreach efforts in the community when compared with Kelowna participants. In addition, Prince George participants felt that they were more at risk as a community whereas participants in Kelowna had a greater degree of optimism about their community's ability to weather the storm.

For the purposes of managing scenic resources, the preferences for management alternatives did not vary significantly to suggest participants prioritized aesthetic values over ecological or perceived risk. However, scenic values was rated as the third most important variable when asked directly compared to recovery time, potential for outdoor recreation and cost. Survey questions pre- and post-visualization experiment demonstrates respondents attitudes towards management scenarios vary little, if any, and are largely pre-determined by other variables. Although the visualization component did not change individual positions on salvaging timber or preferences for variety in forest composition and character, the experiment assists managers in quantitatively assessing public acceptance of visual impacts. Beliefs in past mismanagement are suggested in the respondents' lack of trust in government and the percentage of respondents that would hold them accountable.

Future research and possible products from this study will examine the interrelationships between the Prince George and Kelowna groups in greater detail. Also, there are indications that for some of the environmental value questions there was strong polarization in the sample. In light of that it may prove fruitful to classify respondents and search for patterns of response that may be consistent with social or cultural groups such as First Nations or forestry workers. Given the management alternatives available, even now that we know communities prefer mixed species, further research should examine preferences for human activity and examine the values and connections people make with human activity (such as economic benefits, recreation, ecological damage, community cohesion). In addition, future research might examine the community capacity to respond to mountain pine beetle risks in a high risk scenario, such as those characterized high levels of community vulnerability (MacKendrick & Parkins, 2005).

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5 Acknowledgements

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Contacts:

Michael J. Meitner
Associate Professor
Department of Forest Resources Management
Forest Sciences Centre
2045-2424 Main Mall
University of British Columbia
Vancouver, BC., Canada V6T 1Z4

Telephone: (604) 822-0029
E-Mail: mike.meitner@ubc.ca
FAX: (604) 822-9106

7 Appendix A – Tables

Tables

Table 1: Respondent Location

		Frequency	Percent
Valid	Kelowna	153	49.0
	Prince George	159	51.0
	Total	312	100.0

Table 2: Respondent Gender by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Gender	Male	60.5%	39.6%	50.0%
	Female	39.5%	60.4%	50.0%
Total		100.0%	100.0%	100.0%

Table 3: Respondent Marital Status by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Marital Status	Single	38.7%	33.5%	36.1%
	Married	30.0%	57.4%	43.9%
	Separated	8.0%	3.2%	5.6%
	Divorced	18.0%	5.2%	11.5%
	Widowed	5.3%	.6%	3.0%
Total		100.0%	100.0%	100.0%

Table 4: Respondent Number of Children at Home by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Number of Children at Home	0	75.7%	62.6%	69.1%
	1	13.8%	11.6%	12.7%
	2	7.2%	14.2%	10.7%
	3	3.3%	9.7%	6.5%
	4		1.3%	.7%
	5		.6%	.3%
Total		100.0%	100.0%	100.0%

Table 5: Respondent Industry by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Industry	Construction	21.7%	6.7%	14.2%
	Education and Health Services	18.3%	26.1%	22.2%
	Financial Activities	1.7%	4.2%	2.9%
	Government	4.2%	7.6%	5.9%
	Information	4.2%	1.7%	2.9%
	Leisure and Hospitality	10.0%	6.7%	8.4%
	Manufacturing	5.8%	9.2%	7.5%
	Natural Resources and Mining	8.3%	8.4%	8.4%
	Professional and Business Services	7.5%	7.6%	7.5%
	Transportation and Utilities	6.7%	7.6%	7.1%
	Wholesale and Retail Trade	11.7%	14.3%	13.0%
Total		100.0%	100.0%	100.0%

Table 6: Respondent Highest Education Level by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Highest Education Level Completed	Some Primary	1.3%	0.0%	.7%
	Completed Primary	.7%	1.3%	1.0%
	Some High school	16.4%	8.4%	12.4%
	Completed High school	21.7%	20.6%	21.2%
	Some College	19.1%	21.3%	20.2%
	Received Certificate	21.7%	23.9%	22.8%
	Received Bachelor's	10.5%	14.8%	12.7%
	Some Post-Grad	2.6%	2.6%	2.6%
	Received Post-Grad Degree	5.9%	7.1%	6.5%
Total		100.0%	100.0%	100.0%

Table 7: Respondent Income by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Respondent's Income	0 - 9,999	14.6%	15.1%	14.8%
	10,000 - 19,999	22.6%	13.0%	17.7%
	20,000 - 29,999	16.1%	15.1%	15.5%
	30,000 - 39,999	19.7%	17.1%	18.4%
	40,000 - 59.999	14.6%	21.2%	18.0%
	60,000 - 79,999	8.8%	9.6%	9.2%
	80,000 - 99,999	1.5%	5.5%	3.5%
	100,000 and above	2.2%	3.4%	2.8%
Total		100.0%	100.0%	100.0%

Table 8: Respondent Age (collapsed) by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Age Decades	18-29	19.6%	32.3%	26.0%
	30-39	12.4%	26.5%	19.5%
	40-49	24.8%	12.3%	18.5%
	50-59	19.6%	18.7%	19.2%
	60 and older	23.5%	10.3%	16.9%
Total		100.0%	100.0%	100.0%

Table 9: Respondent Knowledge about MPB in BC by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Know about MPB in BC	Nothing	5.9%	5.1%	5.5%
	A little	62.7%	47.5%	55.0%
	A fair amount	23.5%	36.7%	30.2%
	A good deal	7.8%	10.8%	9.3%
Total		100.0%	100.0%	100.0%

Table 10: Respondent Knowledge about MPB manage in area by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Know about MPB manage in area	Nothing	28.9%	13.9%	21.3%
	A little	52.0%	60.1%	56.1%
	A fair amount	13.2%	20.9%	17.1%
	A good deal	5.9%	5.1%	5.5%
Total		100.0%	100.0%	100.0%

Table 11: Respondent Support Increase in Salvaging by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Support Increase in Salvaging	Less Salvaging	7.9%	10.8%	9.4%
	No Increase	15.1%	23.4%	19.4%
	More Salvaging	54.6%	48.7%	51.6%
	Can't Make an Informed Decision	22.4%	17.1%	19.7%
Total		100.0%	100.0%	100.0%

Table 12: Respondent Support for Increased in Harvesting Infected Timber by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Increase Harvesting	Strongly Disagree	7.4%	.6%	3.9%
	Disagree	9.4%	10.8%	10.1%
	Neither	12.8%	12.1%	12.4%
	Agree	47.0%	51.6%	49.3%
	Strongly Agree	17.4%	19.7%	18.6%
	Don't Know	6.0%	5.1%	5.6%
Total		100.0%	100.0%	100.0%

Table 13: Respondent Support for Reduction in Timber Extraction by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Reduce Timber Extraction	Strongly Disagree	6.6%	6.3%	6.5%
	Disagree	21.9%	25.3%	23.6%
	Neither	22.5%	19.6%	21.0%
	Agree	30.5%	29.7%	30.1%
	Strongly Agree	6.0%	6.3%	6.1%
	Don't Know	12.6%	12.7%	12.6%
Total		100.0%	100.0%	100.0%

Table 14: Respondent Support for Genetically Engineered Reforestation by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Support Genetically Engineered Reforestation	Distrust Artificial Engineering	32.7%	25.3%	28.9%
	Only In this Instance	23.5%	25.9%	24.8%
	Whenever Appropriate	28.1%	27.8%	28.0%
	Can't Decide	15.7%	20.9%	18.3%
Total		100.0%	100.0%	100.0%

Table 15: Respondent Knowledge of BC Mountain Pine Beetle Action Plan by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
BC Mountain Pine Beetle Action Plan	Strongly Disagree	8.7%	11.5%	10.1%
	Disagree	32.2%	35.0%	33.7%
	Neither	16.1%	20.4%	18.3%
	Agree	15.4%	11.5%	13.4%
	Strongly Agree	2.7%	3.8%	3.3%
	Don't Know	24.8%	17.8%	21.2%
Total		100.0%	100.0%	100.0%

Table 16: Respondent Knowledge of Inclusion of First Nation Values by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Inclusion of First Nation Values	Strongly Disagree	7.3%	6.4%	6.9%
	Disagree	14.7%	16.7%	15.7%
	Neither	14.0%	21.2%	17.6%
	Agree	18.7%	23.7%	21.2%
	Strongly Agree	8.7%	3.2%	5.9%
	Don't Know	36.7%	28.8%	32.7%
Total		100.0%	100.0%	100.0%

Table 17: Respondent Support for Biofuel Processing Plant by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
Biofuel Processing Plant	Strongly Disagree	4.6%	.6%	2.6%
	Disagree	12.4%	8.2%	10.3%
	Neither	11.1%	15.7%	13.5%
	Agree	45.8%	40.3%	42.9%
	Strongly Agree	11.8%	15.1%	13.5%
	Don't Know	14.4%	20.1%	17.3%
Total		100.0%	100.0%	100.0%

Table 18: Respondent Belief About MPB Outbreak Origin by Location in Percent

		Respondent Location		
		Kelowna	Prince George	Total
MPB Outbreak Natural Anomaly	MPB is a Natural Anomaly	16.4%	21.1%	18.8%
	Both	42.9%	34.2%	38.4%
	People Are Largely to Blame	40.7%	44.7%	42.8%
Total		100.0%	100.0%	100.0%

Table 19: Likert Table

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
	Row N %	Row N %	Row N %	Row N %	Row N %
Natural Part of Forest Ecology (19)	6.5%	16.8%	12.7%	51.0%	13.0%
BC Mountain Pine Beetle Action Plan (20)	12.9%	42.7%	23.2%	17.0%	4.1%
Industry Justify Clearcut Logging (21)	10.5%	29.6%	17.1%	30.7%	12.2%
Increase Harvesting (22)	4.2%	10.7%	13.1%	52.2%	19.7%
Forest Will Never Recover Fully (23)	16.9%	44.4%	14.1%	17.6%	7.0%
Strong Local Economy (24)	5.7%	35.2%	17.8%	36.7%	4.6%
Biofuel Processing Plant (25)	3.1%	12.4%	16.3%	51.9%	16.3%
BC Wood Products Decrease Value (26)	4.0%	25.3%	19.8%	44.0%	7.0%
Small Grants Are Necessary (28)	1.7%	10.1%	17.5%	49.0%	21.7%
Inclusion of First Nation Values (29)	10.2%	23.3%	26.2%	31.6%	8.7%
Forests Will Adapt to MPB (30)	20.9%	35.2%	14.3%	25.6%	4.0%
Reduce Timber Extraction (31)	7.4%	27.0%	24.1%	34.4%	7.0%
Forest Industry Was Previously More Important (32)	7.3%	26.3%	12.5%	41.2%	12.8%
Biodiversity Increases Benefits to Communities (33)	13.5%	45.5%	17.1%	19.3%	4.7%
Modern Science Will Solve Our Problems (34)	19.9%	41.5%	20.9%	14.3%	3.5%
Worry Too Much About the Environment and Not Jobs (35)	35.3%	38.6%	7.6%	11.9%	6.6%
Environmental Protection Requires Economic Growth (36)	7.1%	14.5%	13.2%	41.2%	24.0%
Economic Growth Always Harms the Environment (37)	6.0%	36.1%	23.7%	26.4%	7.7%
Personally Too Difficult To Help Environment (38)	18.9%	56.3%	10.3%	11.6%	3.0%
Environmental Threats are Exaggerated (39)	22.6%	42.4%	14.6%	16.3%	4.2%
Canada Economic Progress Will Slow Down (40)	2.7%	9.7%	8.4%	48.0%	31.2%

Note: Numbers in the parentheses refer to the order of the questions as they occur in the survey.
With the exception of a few questions, generally there are no significant differences between sub-groups and, therefore, the scale is presented as such.

8 Appendix B – Additional tabular results and discussion

8.1 Outcome 1

Report

Respondent Location		Prefer Scenario 1: Do Nothing (2.1)	Prefer Scenario 2: Replant with Pure Pine (2.2)	Prefer Scenario 3: Replant with Mixed Species (2.3)	Prefer Scenario 4: Replant with Fertilized Pine (2.4)
Kelowna	Mean	1.86	2.38	3.30	2.38
	N	141	141	149	141
Prince George	Mean	1.71	2.52	3.39	2.24
	N	158	158	158	158
Total	Mean	1.78	2.45	3.35	2.31
	N	299	299	307	299

Management Preferences

	Least Preferred	2	3	Most Preferred
	Row N %	Row N %	Row N %	Row N %
Prefer Scenario 1: Do Nothing (2.1)	62.5%	12.0%	10.4%	15.1%
Prefer Scenario 2: Replant with Pure Pine (2.2)	12.7%	40.5%	35.8%	11.0%
Prefer Scenario 3: Replant with Mixed Species (2.3)	7.5%	13.0%	16.9%	62.5%
Prefer Scenario 4: Replant with Fertilized Pine (2.4)	31.1%	23.4%	29.1%	16.4%

Although both groups prefer scenario 1 the least, residents of Kelowna are more likely to prefer scenario 'Do Nothing' than residents of Prince George.

AGGREGATE Support More or Less Harvesting (9)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less Harvesting	51	16.3	16.6	16.6
	2	46	14.7	14.9	31.5
	No Change	56	17.9	18.2	49.7
	4	90	28.8	29.2	78.9
	More Harvesting	65	20.8	21.1	100.0
	Total	308	98.7	100.0	
Missing	Missing Data	4	1.3		
Total		312	100.0		

The question worded as "Some experts argue that a necessary response to the mountain pine beetle outbreak is to increase harvesting levels of all standing pine (including unaffected trees). Do you generally support more or less harvesting" was used to examine individual's support for harvesting generally. The result is a fair amount of variation. This first measure of support for harvesting indicates that 32% would support less harvesting while about 50% would support more harvesting of all standing pine.

KELOWNA Support More or Less Harvesting (9)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less Harvesting	27	17.6	17.9	17.9
	2	24	15.7	15.9	33.8
	No Change	29	19.0	19.2	53.0
	4	41	26.8	27.2	80.1
	More Harvesting	30	19.6	19.9	100.0
	Total	151	98.7	100.0	
Missing	Missing Data	2	1.3		
Total		153	100.0		

PRINCE GEORGE Support More or Less Harvesting (9)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less Harvesting	24	15.1	15.3	15.3
	2	22	13.8	14.0	29.3
	No Change	27	17.0	17.2	46.5
	4	49	30.8	31.2	77.7
	More Harvesting	35	22.0	22.3	100.0
	Total	157	98.7	100.0	
Missing	Missing Data	2	1.3		
Total		159	100.0		

People in Prince George (53%) show a slight tendency toward supporting more harvesting than residents in Kelowna (47%).

AGGREGATE Support the Use of Fertilization (10)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	70	22.4	36.8	36.8
	Yes	120	38.5	63.2	100.0
	Total	190	60.9	100.0	
Missing	Can't Decide	119	38.1		
	No Answer	3	1.0		
	Total	122	39.1		
Total		312	100.0		

Only 39% would support the use of fertilization to assist the faster regrowth of trees with an equal number indicating they cannot make an informed decision. Over one-fifth would not support the use of fertilization, confirming the responses to the scenario preference rankings.

KELOWNA Support the Use of Fertilization (10)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	35	22.9	38.5	38.5
	Yes	56	36.6	61.5	100.0
	Total	91	59.5	100.0	
Missing	Can't Decide	61	39.9		
	No Answer	1	.7		
	Total	62	40.5		
Total		153	100.0		

PRINCE GEORGE Support the Use of Fertilization (10)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	35	22.0	22.3	22.3
	Yes	64	40.3	40.8	63.1
	Can't Decide	58	36.5	36.9	100.0
	Total	157	98.7	100.0	
Missing	No Answer	2	1.3		
Total		159	100.0		

AGGREGATE Replant Pine or Other Species (12)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Replant Pine	46	14.7	16.6	16.6
	Diversify Tree Species	215	68.9	77.6	94.2
	Replant non-pine	16	5.1	5.8	100.0
	Total	277	88.8	100.0	
Missing	Can't Decide	34	10.9		
	No Answer	1	.3		
	Total	35	11.2		
Total		312	100.0		

Over 80% said they "would rather replant using a mix of forest species", confirming the clear preference for forest diversity found in responses to other questions.

KELOWNA Replant Pine or Other Species (12)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Replant Pine	15	9.8	11.1	11.1
	Diversify Tree Species	110	71.9	81.5	92.6
	Replant non-pine	10	6.5	7.4	100.0
	Total	135	88.2	100.0	
Missing	Can't Decide	18	11.8		
Total		153	100.0		

PRINCE GEORGE Replant Pine or Other Species (12)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Replant Pine	31	19.5	19.6	19.6
	Diversify Tree Species	105	66.0	66.5	86.1
	Replant non-pine	6	3.8	3.8	89.9
	Can't Decide	16	10.1	10.1	100.0
	Total	158	99.4	100.0	
Missing	No Answer	1	.6		
Total		159	100.0		

8.2 Outcome 2

AGGREGATE MPB Outbreak Natural Anomaly (15)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MPB is a Natural Anomaly	29	9.3	9.9	9.9
	2	26	8.3	8.9	18.8
	Both	112	35.9	38.4	57.2
	4	57	18.3	19.5	76.7
	People Are Largely to Blame	68	21.8	23.3	100.0
	Total	292	93.6	100.0	
Missing	Can't Make an Informed Decision	14	4.5		
	Missing Data	6	1.9		
	Total	20	6.4		
Total		312	100.0		

Although most scientists are in consensus that global warming is both real and a major contributing factor in the extent of the mountain pine beetle outbreak, almost 20% of the respondents believe the outbreak is a natural anomaly. There is, however, considerable support for the idea that the mountain pine beetle outbreak represents the consequences of human mismanagement. Thirty-eight percent believe the outbreak is both the result of an anomaly in the natural cycle of disturbance ecology and the effects of human-induced temperature increases, while over 40% believe people are largely to blame.

KELOWNA MPB Outbreak Natural Anomaly (15)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MPB is a Natural Anomaly	11	7.2	7.9	7.9
	2	12	7.8	8.6	16.4
	Both	60	39.2	42.9	59.3
	4	26	17.0	18.6	77.9
	People Are Largely to Blame	31	20.3	22.1	100.0
	Total	140	91.5	100.0	
Missing	Can't Make an Informed Decision	10	6.5		
	Missing Data	3	2.0		
	Total	13	8.5		
Total		153	100.0		

PRINCE GEORGE MPB Outbreak Natural Anomaly (15)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MPB is a Natural Anomaly	18	11.3	11.5	11.5
	2	14	8.8	9.0	20.5
	Both	52	32.7	33.3	53.8
	4	31	19.5	19.9	73.7
	People Are Largely to Blame	37	23.3	23.7	97.4
	8	4	2.5	2.6	100.0
	Total	156	98.1	100.0	
Missing	Missing Data	3	1.9		
Total		159	100.0		

Report

Respondent Location		Beauty Scenario 1: Do Nothing (2.12)	Beauty Scenario 2: Replant with Pure Pine (2.13)	Beauty Scenario 3: Replant with Mixed Species (2.14)	Beauty Scenario 4: Replant with Fertilized Pine (2.15)
Kelowna	Mean	1.93	2.46	2.94	2.62
	N	138	136	137	138
Prince George	Mean	1.92	2.34	3.07	2.73
	N	155	155	156	156
Total	Mean	1.92	2.40	3.01	2.68
	N	293	291	293	294

The Beauty scenario exhibits similar preferences to those in the management scenario. Mixed species is still the most preferred while do nothing is least preferred; however, the means show people prefer the fertilized pine over the image set of the pure pine. Remember, however, a critical portion (22% in Prince George and 25% in Kelowna) find the fertilized scenario to be the least beautiful and is likely to be a conscious objection to fertilizer than accurately representing individual preferences for forest character.

AGGREGATE Beauty Comparison

	Least Preferred	2	3	Most Preferred
	Row N %	Row N %	Row N %	Row N %
Beauty Scenario 1: Do Nothing (2.12)	58.7%	9.9%	11.6%	19.8%
Beauty Scenario 2: Replant with Pure Pine (2.13)	10.0%	52.6%	25.4%	12.0%
Beauty Scenario 3: Replant with Mixed Species (2.14)	8.2%	19.8%	34.8%	37.2%
Beauty Scenario 4: Replant with Fertilized Pine (2.15)	23.8%	16.7%	27.6%	32.0%

Report

Respondent Location		Trust in Forest Industry (3)	Trust in Environmental Groups (4)	Trust in Government (5)	Trust in Media (6)	Trust in University Research Centers (7)
Kelowna	Mean	3.33	3.61	2.50	2.79	4.06
	N	140	142	141	140	138
Prince George	Mean	2.96	3.37	2.38	2.80	3.82
	N	156	154	148	153	152
Total	Mean	3.13	3.49	2.44	2.79	3.93
	N	296	296	289	293	290

AGGREGATE Trust Comparison

	Hardly Any	Not Much	Some Trust	Quite A Lot	Great Deal
	Row N %	Row N %	Row N %	Row N %	Row N %
Trust in Forest Industry (3)	11.5%	18.6%	30.7%	23.6%	15.5%
Trust in Environmental Groups (4)	6.4%	10.1%	34.8%	25.7%	23.0%
Trust in Government (5)	19.4%	35.3%	30.8%	11.1%	3.5%
Trust in Media (6)	11.6%	31.4%	30.4%	19.5%	7.2%
Trust in University Research Centers (7)	4.8%	2.8%	22.8%	33.8%	35.9%

Overall, mean scores (3.93 Universities, 3.49 Environmental Groups, 3.13 Forest Industry, 2.79 Media, 2.44 Government) indicate residents in these areas trust University Research Centres to give 'correct information about the mountain pine beetle' more than other groups and have the least amount of trust in government sources. This lack of trust in government seems to also be reflected in the extent to which they are holding the government primarily accountable for management of the mountain pine beetle and may be a response to observed views of past mismanagement.

KELOWNA Trust in Forest Industry (3)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hardly Any	14	9.2	10.0	10.0
	Not Much	17	11.1	12.1	22.1
	Some Trust	45	29.4	32.1	54.3
	Quite A Lot	37	24.2	26.4	80.7
	Great Deal	27	17.6	19.3	100.0
	Total	140	91.5	100.0	
Missing	No Answer	13	8.5		
Total		153	100.0		

PRINCE GEORGE Trust in Forest Industry (3)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hardly Any	20	12.6	12.8	12.8
	Not Much	38	23.9	24.4	37.2
	Some Trust	46	28.9	29.5	66.7
	Quite A Lot	33	20.8	21.2	87.8
	Great Deal	19	11.9	12.2	100.0
	Total	156	98.1	100.0	
Missing	No Answer	3	1.9		
Total		159	100.0		

KELOWNA Trust in Environmental Groups (4)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hardly Any	9	5.9	6.3	6.3
	Not Much	10	6.5	7.0	13.4
	Some Trust	48	31.4	33.8	47.2
	Quite A Lot	35	22.9	24.6	71.8
	Great Deal	40	26.1	28.2	100.0
	Total	142	92.8	100.0	
Missing	No Answer	11	7.2		
Total		153	100.0		

PRINCE GEORGE Trust in Environmental Groups (4)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hardly Any	10	6.3	6.5	6.5
	Not Much	20	12.6	13.0	19.5
	Some Trust	55	34.6	35.7	55.2
	Quite A Lot	41	25.8	26.6	81.8
	Great Deal	28	17.6	18.2	100.0
	Total	154	96.9	100.0	
Missing	No Answer	5	3.1		
Total		159	100.0		

KELOWNA Trust in Government (5)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hardly Any	25	16.3	17.7	17.7
	Not Much	51	33.3	36.2	53.9
	Some Trust	43	28.1	30.5	84.4
	Quite A Lot	13	8.5	9.2	93.6
	Great Deal	9	5.9	6.4	100.0
	Total	141	92.2	100.0	
Missing	No Answer	12	7.8		
Total		153	100.0		

PRINCE GEORGE Trust in Government (5)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hardly Any	31	19.5	20.9	20.9
	Not Much	51	32.1	34.5	55.4
	Some Trust	46	28.9	31.1	86.5
	Quite A Lot	19	11.9	12.8	99.3
	Great Deal	1	.6	.7	100.0
	Total	148	93.1	100.0	
Missing	No Answer	11	6.9		
Total		159	100.0		

KELOWNA Trust in Media (6)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hardly Any	18	11.8	12.9	12.9
	Not Much	40	26.1	28.6	41.4
	Some Trust	44	28.8	31.4	72.9
	Quite A Lot	30	19.6	21.4	94.3
	Great Deal	8	5.2	5.7	100.0
	Total	140	91.5	100.0	
Missing	No Answer	13	8.5		
Total		153	100.0		

PRINCE GEORGE Trust in Media (6)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hardly Any	16	10.1	10.5	10.5
	Not Much	52	32.7	34.0	44.4
	Some Trust	45	28.3	29.4	73.9
	Quite A Lot	27	17.0	17.6	91.5
	Great Deal	13	8.2	8.5	100.0
	Total	153	96.2	100.0	
Missing	No Answer	6	3.8		
Total		159	100.0		

KELOWNA Trust in University Research Centers (7)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hardly Any	6	3.9	4.3	4.3
	Not Much	2	1.3	1.4	5.8
	Some Trust	26	17.0	18.8	24.6
	Quite A Lot	48	31.4	34.8	59.4
	Great Deal	56	36.6	40.6	100.0
	Total	138	90.2	100.0	
Missing	No Answer	15	9.8		
Total		153	100.0		

PRINCE GEORGE Trust in University Research Centers (7)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Hardly Any	8	5.0	5.3	5.3
	Not Much	6	3.8	3.9	9.2
	Some Trust	40	25.2	26.3	35.5
	Quite A Lot	50	31.4	32.9	68.4
	Great Deal	48	30.2	31.6	100.0
	Total	152	95.6	100.0	
Missing	No Answer	7	4.4		
Total		159	100.0		

AGGREGATE Accountable for Managing MPB (16)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Government	200	64.1	75.2	75.2
	Private Citizens	7	2.2	2.6	77.8
	Industry	59	18.9	22.2	100.0
	Total	266	85.3	100.0	
Missing	None of the Above	28	9.0		
	Missing Data	18	5.8		
	Total	46	14.7		
Total		312	100.0		

Three quarters of individuals believe the government "should be held primarily accountable for managing the MPB and its consequences for communities and forests" over forest industry (22%) and private citizens (3%).

KELOWNA Accountable for Managing MPB (16)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Government	94	61.4	74.0	74.0
	Private Citizens	6	3.9	4.7	78.7
	Industry	27	17.6	21.3	100.0
	Total	127	83.0	100.0	
Missing	None of the Above	15	9.8		
	Missing Data	11	7.2		
	Total	26	17.0		
Total		153	100.0		

PRINCE GEORGE Accountable for Managing MPB (16)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Government	106	66.7	69.7	69.7
	Private Citizens	1	.6	.7	70.4
	Industry	32	20.1	21.1	91.4
	None of the Above	13	8.2	8.6	100.0
	Total	152	95.6	100.0	
Missing	Missing Data	7	4.4		
Total		159	100.0		

AGGREGATE Natural Part of Forest Ecology (19)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	19	6.1	6.5	6.5
	Disagree	49	15.7	16.8	23.3
	Neither	37	11.9	12.7	36.0
	Agree	149	47.8	51.0	87.0
	Strongly Agree	38	12.2	13.0	100.0
	Total	292	93.6	100.0	
Missing	Don't Know	16	5.1		
	Missing Data	4	1.3		
	Total	20	6.4		
Total		312	100.0		

Over 64% agree to strongly agree that the MPB is a natural part of the forest ecology.

KELOWNA Natural Part of Forest Ecology (19)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	11	7.2	8.0	8.0
	Disagree	22	14.4	15.9	23.9
	Neither	20	13.1	14.5	38.4
	Agree	69	45.1	50.0	88.4
	Strongly Agree	16	10.5	11.6	100.0
	Total	138	90.2	100.0	
Missing	Don't Know	12	7.8		
	Missing Data	3	2.0		
	Total	15	9.8		
Total		153	100.0		

PRINCE GEORGE Natural Part of Forest Ecology (19)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	5.0	5.2	5.2
	Disagree	27	17.0	17.5	22.7
	Neither	17	10.7	11.0	33.8
	Agree	80	50.3	51.9	85.7
	Strongly Agree	22	13.8	14.3	100.0
	Total	154	96.9	100.0	
Missing	Don't Know	4	2.5		
	Missing Data	1	.6		
	Total	5	3.1		
Total		159	100.0		

AGGREGATE Forest Will Never Recover Fully (23)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	48	15.4	16.9	16.9
	Disagree	126	40.4	44.4	61.3
	Neither	40	12.8	14.1	75.4
	Agree	50	16.0	17.6	93.0
	Strongly Agree	20	6.4	7.0	100.0
	Total	284	91.0	100.0	
Missing	Don't Know	25	8.0		
	Missing Data	3	1.0		
	Total	28	9.0		
Total		312	100.0		

There is a general belief that the forest will fully recover. Over 60% respondents disagree to strongly disagree with the statement that "The level of disturbance caused by the MPB is irreversible and the forest will never recover fully".

KELOWNA Forest Will Never Recover Fully (23)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	23	15.0	17.2	17.2
	Disagree	61	39.9	45.5	62.7
	Neither	17	11.1	12.7	75.4
	Agree	24	15.7	17.9	93.3
	Strongly Agree	9	5.9	6.7	100.0
	Total	134	87.6	100.0	
Missing	Don't Know	17	11.1		
	Missing Data	2	1.3		
	Total	19	12.4		
Total		153	100.0		

Forest Will Never Recover Fully (23)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	25	15.7	16.7	16.7
	Disagree	65	40.9	43.3	60.0
	Neither	23	14.5	15.3	75.3
	Agree	26	16.4	17.3	92.7
	Strongly Agree	11	6.9	7.3	100.0
	Total	150	94.3	100.0	
Missing	Don't Know	8	5.0		
	Missing Data	1	.6		
	Total	9	5.7		
Total		159	100.0		

8.3 Outcome 3

Report

Respondent Location		Recovery Time (2.5)	Cost (2.6)	Risk of Future Outbreaks (2.7)	Ecological Effects (2.8)	Scenic Beauty of the Area (2.9)	Potential for Outdoor Recreation (2.10)
Kelowna	Mean	3.04	2.44	3.84	3.98	3.12	2.86
	N	151	147	147	148	144	147
Prince George	Mean	2.97	2.85	3.82	3.91	3.15	2.94
	N	158	158	157	157	158	158
Total	Mean	3.01	2.66	3.83	3.94	3.13	2.90
	N	309	305	304	305	302	305

Factors in Decisions

	Not Important	0	Somewhat Important	Important	Very Important	Extremely Important
	Row N %	Row N %	Row N %	Row N %	Row N %	Row N %
Recovery Time (2.5)	7.8%	.0%	24.3%	38.5%	18.4%	11.0%
Cost (2.6)	18.7%	.0%	26.9%	30.8%	17.4%	6.2%
Risk of Future Outbreaks (2.7)	2.6%	.3%	9.5%	19.1%	38.2%	30.3%
Ecological Effects (2.8)	1.0%	.0%	5.6%	23.3%	38.4%	31.8%
Scenic Beauty of the Area (2.9)	8.6%	.0%	21.5%	33.1%	21.5%	15.2%
Potential for Outdoor Recreation (2.10)	11.1%	.0%	28.5%	29.2%	21.6%	9.5%

KELOWNA Recovery Time (2.5)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important	15	9.8	9.9	9.9
	Somewhat Important	30	19.6	19.9	29.8
	Important	61	39.9	40.4	70.2
	Very Important	24	15.7	15.9	86.1
	Extremely Important	21	13.7	13.9	100.0
	Total	151	98.7	100.0	
Missing	Missing Data	2	1.3		
Total		153	100.0		

KELOWNA Cost (2.6)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important	34	22.2	23.1	23.1
	Somewhat Important	46	30.1	31.3	54.4
	Important	42	27.5	28.6	83.0
	Very Important	18	11.8	12.2	95.2
	Extremely Important	7	4.6	4.8	100.0
	Total	147	96.1	100.0	
Missing	Missing Data	6	3.9		
Total		153	100.0		

Cost (2.6)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important	23	14.5	14.6	14.6
	Somewhat Important	36	22.6	22.8	37.3
	Important	52	32.7	32.9	70.3
	Very Important	35	22.0	22.2	92.4
	Extremely Important	12	7.5	7.6	100.0
	Total	158	99.4	100.0	
Missing	Missing Data	1	.6		
Total		159	100.0		

KELOWNA Risk of Future Outbreaks (2.7)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	1	.7	.7	.7
	Not Important	3	2.0	2.0	2.7
	Somewhat Important	13	8.5	8.8	11.6
	Important	28	18.3	19.0	30.6
	Very Important	59	38.6	40.1	70.7
	Extremely Important	43	28.1	29.3	100.0
	Total	147	96.1	100.0	
Missing	Missing Data	6	3.9		
Total		153	100.0		

Risk of Future Outbreaks (2.7)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important	5	3.1	3.2	3.2
	Somewhat Important	16	10.1	10.2	13.4
	Important	30	18.9	19.1	32.5
	Very Important	57	35.8	36.3	68.8
	Extremely Important	49	30.8	31.2	100.0
	Total	157	98.7	100.0	
Missing	Missing Data	2	1.3		
Total		159	100.0		

KELOWNA Ecological Effects (2.8)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important	3	2.0	2.0	2.0
	Somewhat Important	7	4.6	4.7	6.8
	Important	30	19.6	20.3	27.0
	Very Important	58	37.9	39.2	66.2
	Extremely Important	50	32.7	33.8	100.0
	Total	148	96.7	100.0	
Missing	Missing Data	5	3.3		
Total		153	100.0		

Ecological Effects (2.8)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Somewhat Important	10	6.3	6.4	6.4
	Important	41	25.8	26.1	32.5
	Very Important	59	37.1	37.6	70.1
	Extremely Important	47	29.6	29.9	100.0
	Total	157	98.7	100.0	
Missing	Missing Data	2	1.3		
Total		159	100.0		

KELOWNA Scenic Beauty of the Area (2.9)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important	14	9.2	9.7	9.7
	Somewhat Important	37	24.2	25.7	35.4
	Important	37	24.2	25.7	61.1
	Very Important	30	19.6	20.8	81.9
	Extremely Important	26	17.0	18.1	100.0
	Total	144	94.1	100.0	
Missing	Missing Data	9	5.9		
Total		153	100.0		

Scenic Beauty of the Area (2.9)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important	12	7.5	7.6	7.6
	Somewhat Important	28	17.6	17.7	25.3
	Important	63	39.6	39.9	65.2
	Very Important	35	22.0	22.2	87.3
	Extremely Important	20	12.6	12.7	100.0
	Total	158	99.4	100.0	
Missing	Missing Data	1	.6		
Total		159	100.0		

KELOWNA Potential for Outdoor Recreation (2.10)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important	20	13.1	13.6	13.6
	Somewhat Important	43	28.1	29.3	42.9
	Important	40	26.1	27.2	70.1
	Very Important	26	17.0	17.7	87.8
	Extremely Important	18	11.8	12.2	100.0
	Total	147	96.1	100.0	
Missing	Missing Data	6	3.9		
Total		153	100.0		

Potential for Outdoor Recreation (2.10)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not Important	14	8.8	8.9	8.9
	Somewhat Important	44	27.7	27.8	36.7
	Important	49	30.8	31.0	67.7
	Very Important	40	25.2	25.3	93.0
	Extremely Important	11	6.9	7.0	100.0
	Total	158	99.4	100.0	
Missing	Missing Data	1	.6		
Total		159	100.0		

AGGREGATE Support Increase in Salvaging (13)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less Salvaging	29	9.3	11.6	11.6
	No Increase	60	19.2	24.1	35.7
	More Salvaging	160	51.3	64.3	100.0
	Total	249	79.8	100.0	
Missing	Can't Make an Informed Decision	61	19.6		
	No Answer	2	.6		
	Total	63	20.2		
Total		312	100.0		

In contrast to the previous question about support for increased harvesting of pine, this question measures support for polices though "increased salvaging now will likely result in the elimination of jobs in the future (15-20 years) after all of the affected pine has been cut and there is no more available mature pine to harvest." Results show that over 60% of the sample would increase salvaging believing that the immediate benefits of harvesting outweigh the potential long-term costs.

KELOWNA Support Increase in Salvaging (13)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less Salvaging	12	7.8	10.2	10.2
	No Increase	23	15.0	19.5	29.7
	More Salvaging	83	54.2	70.3	100.0
	Total	118	77.1	100.0	
Missing	Can't Make an Informed Decision	34	22.2		
	No Answer	1	.7		
	Total	35	22.9		
Total		153	100.0		

PRINCE GEORGE Support Increase in Salvaging (13)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less Salvaging	17	10.7	10.8	10.8
	No Increase	37	23.3	23.4	34.2
	More Salvaging	77	48.4	48.7	82.9
	Can't Make an Informed Decision	27	17.0	17.1	100.0
	Total	158	99.4	100.0	
Missing	No Answer	1	.6		
Total		159	100.0		

AGGREGATE Growth in Other Industries Replace Forest Jobs (14)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not At All	31	9.9	11.0	11.0
	A Small Portion	110	35.3	38.9	49.8
	A Fair Majority	101	32.4	35.7	85.5
	Almost Completely	35	11.2	12.4	97.9
	Absolutely All	6	1.9	2.1	100.0
	Total	283	90.7	100.0	
Missing	Can't Make An Informed Decision	28	9.0		
	No Answer	1	.3		
	Total	29	9.3		
Total		312	100.0		

Half of the respondents are fairly pessimistic about the likelihood that new jobs will replace even a small portion of the ones lost in the MPB outbreak.

KELOWNA Growth in Other Industries Replace Forest Jobs (14)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not At All	14	9.2	10.6	10.6
	A Small Portion	50	32.7	37.9	48.5
	A Fair Majority	46	30.1	34.8	83.3
	Almost Completely	21	13.7	15.9	99.2
	Absolutely All	1	.7	.8	100.0
	Total	132	86.3	100.0	
Missing	Can't Make An Informed Decision	21	13.7		
Total		153	100.0		

PRINCE GEORGE Growth in Other Industries Replace Forest Jobs (14)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not At All	17	10.7	10.8	10.8
	A Small Portion	60	37.7	38.0	48.7
	A Fair Majority	55	34.6	34.8	83.5
	Almost Completely	14	8.8	8.9	92.4
	Absolutely All	5	3.1	3.2	95.6
	Can't Make An Informed Decision	7	4.4	4.4	100.0
	Total	158	99.4	100.0	
Missing	No Answer	1	.6		
Total		159	100.0		

AGGREGATE Strong Local Economy (24)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	16	5.1	5.7	5.7
	Disagree	99	31.7	35.2	40.9
	Neither	50	16.0	17.8	58.7
	Agree	103	33.0	36.7	95.4
	Strongly Agree	13	4.2	4.6	100.0
	Total	281	90.1	100.0	
Missing	Don't Know	30	9.6		
	Missing Data	1	.3		
	Total	31	9.9		
Total		312	100.0		

This table may misrepresent the underlying differences between the Prince George and Kelowna populations. Although here it would appear that the sample is evenly split and it can be inferred where the opinions are stemming from, independent analysis of the two samples show Prince George is generally less optimistic than Kelowna. Of the Prince George residents, 50% disagree to strongly disagree that the "local economy is strong enough to hold out through a shortage of logging activity." Although a third of the Prince George sample is a little more optimistic, it raises some serious concerns compared with the 50% in Kelowna who agree their economy is strong enough to endure a shortage of logging activity.

KELOWNA Strong Local Economy (24)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	7	4.6	5.1	5.1
	Disagree	36	23.5	26.3	31.4
	Neither	25	16.3	18.2	49.6
	Agree	60	39.2	43.8	93.4
	Strongly Agree	9	5.9	6.6	100.0
	Total	137	89.5	100.0	
Missing	Don't Know	15	9.8		
	Missing Data	1	.7		
	Total	16	10.5		
Total		153	100.0		

PRINCE GEORGE Strong Local Economy (24)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	9	5.7	6.3	6.3
	Disagree	63	39.6	43.8	50.0
	Neither	25	15.7	17.4	67.4
	Agree	43	27.0	29.9	97.2
	Strongly Agree	4	2.5	2.8	100.0
	Total	144	90.6	100.0	
Missing	Don't Know	15	9.4		
Total		159	100.0		

AGGREGATE BC Wood Products Decrease Value (26)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	11	3.5	4.0	4.0
	Disagree	69	22.1	25.3	29.3
	Neither	54	17.3	19.8	49.1
	Agree	120	38.5	44.0	93.0
	Strongly Agree	19	6.1	7.0	100.0
	Total	273	87.5	100.0	
Missing	Don't Know	36	11.5		
	Missing Data	3	1.0		
	Total	39	12.5		
Total		312	100.0		

While almost 1/3 of respondents disagree, over half of the respondents agree to strongly agree that BC wood products will decrease in value on the global market due to the MPB.

KELOWNA BC Wood Products Decrease Value (26)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	5.2	6.2	6.2
	Disagree	38	24.8	29.5	35.7
	Neither	28	18.3	21.7	57.4
	Agree	47	30.7	36.4	93.8
	Strongly Agree	8	5.2	6.2	100.0
	Total	129	84.3	100.0	
Missing	Don't Know	22	14.4		
	Missing Data	2	1.3		
	Total	24	15.7		
Total		153	100.0		

PRINCE GEORGE BC Wood Products Decrease Value (26)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	1.9	2.1	2.1
	Disagree	31	19.5	21.5	23.6
	Neither	26	16.4	18.1	41.7
	Agree	73	45.9	50.7	92.4
	Strongly Agree	11	6.9	7.6	100.0
	Total	144	90.6	100.0	
Missing	Don't Know	14	8.8		
	Missing Data	1	.6		
	Total	15	9.4		
Total		159	100.0		

AGGREGATE Personal Impact Economically (27)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	9	2.9	3.1	3.1
	Disagree	54	17.3	18.7	21.8
	Neither	34	10.9	11.8	33.6
	Agree	151	48.4	52.2	85.8
	Strongly Agree	41	13.1	14.2	100.0
	Total	289	92.6	100.0	
Missing	Don't Know	21	6.7		
	Missing Data	2	.6		
	Total	23	7.4		
Total		312	100.0		

Though individuals in both populations generally agree that they will feel the economic impact of the mountain pine beetle if the value of wood products decreases in value, almost a 1/3 of Kelowna disagree with the statement while only 15% of Prince George disagree. This would seem to support the view that risks and impacts are being perceived as greater by the residents of Prince George than those of Kelowna.

KELOWNA Personal Impact Economically (27)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	6	3.9	4.4	4.4
	Disagree	35	22.9	25.5	29.9
	Neither	10	6.5	7.3	37.2
	Agree	69	45.1	50.4	87.6
	Strongly Agree	17	11.1	12.4	100.0
	Total	137	89.5	100.0	
Missing	Don't Know	14	9.2		
	Missing Data	2	1.3		
	Total	16	10.5		
Total		153	100.0		

PRINCE GEORGE Personal Impact Economically (27)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	3	1.9	2.0	2.0
	Disagree	19	11.9	12.5	14.5
	Neither	24	15.1	15.8	30.3
	Agree	82	51.6	53.9	84.2
	Strongly Agree	24	15.1	15.8	100.0
	Total	152	95.6	100.0	
Missing	Don't Know	7	4.4		
Total		159	100.0		

AGGREGATE Worry Too Much About the Environment and Not Jobs (35)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	107	34.3	35.3	35.3
	Disagree	117	37.5	38.6	73.9
	Neither	23	7.4	7.6	81.5
	Agree	36	11.5	11.9	93.4
	Strongly Agree	20	6.4	6.6	100.0
	Total	303	97.1	100.0	
Missing	Don't Know	5	1.6		
	Missing Data	4	1.3		
	Total	9	2.9		
Total		312	100.0		

According to these results and as seen in the two populations separately, the environment seems to be a higher concern than jobs and perhaps demonstrates an awareness that the two may go hand in hand, that jobs can not come at the cost of environmental protection. In Prince George, while 73% disagree to strongly disagree, about 20% agree to strongly agree that we worry too much about the environment and not enough about jobs. Of Kelowna residents, 75% show stronger environmental concern, whereas 17% are more worried about jobs. Again, although the samples are perhaps too small to determine the generalizability at this point, this makes sense and future studies in these areas should examine this difference.

KELOWNA Worry Too Much About the Environment and Not Jobs (35)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	53	34.6	36.6	36.6
	Disagree	56	36.6	38.6	75.2
	Neither	12	7.8	8.3	83.4
	Agree	14	9.2	9.7	93.1
	Strongly Agree	10	6.5	6.9	100.0
	Total	145	94.8	100.0	
Missing	Don't Know	4	2.6		
	Missing Data	4	2.6		
	Total	8	5.2		
Total		153	100.0		

PRINCE GEORGE Worry Too Much About the Environment and Not Jobs (35)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	54	34.0	34.2	34.2
	Disagree	61	38.4	38.6	72.8
	Neither	11	6.9	7.0	79.7
	Agree	22	13.8	13.9	93.7
	Strongly Agree	10	6.3	6.3	100.0
	Total	158	99.4	100.0	
Missing	Don't Know	1	.6		
Total		159	100.0		

AGGREGATE Environmental Protection Requires Economic Growth (36)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	21	6.7	7.1	7.1
	Disagree	43	13.8	14.5	21.6
	Neither	39	12.5	13.2	34.8
	Agree	122	39.1	41.2	76.0
	Strongly Agree	71	22.8	24.0	100.0
	Total	296	94.9	100.0	
Missing	Don't Know	16	5.1		
Total		312	100.0		

As similarly seen earlier, this figure does not represent possibly substantive differences between Prince George and Kelowna and may reflect an emerging theme in this analysis. While 70% of individuals from Prince George agree to strongly agree that "To protect the environment, British Columbia needs a strong economy", under 60% of Kelowna residents agree.

KELOWNA Environmental Protection Requires Economic Growth (36)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	17	11.1	12.1	12.1
	Disagree	23	15.0	16.4	28.6
	Neither	17	11.1	12.1	40.7
	Agree	53	34.6	37.9	78.6
	Strongly Agree	30	19.6	21.4	100.0
	Total	140	91.5	100.0	
Missing	Don't Know	13	8.5		
Total		153	100.0		

PRINCE GEORGE Environmental Protection Requires Economic Growth (36)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	2.5	2.6	2.6
	Disagree	20	12.6	12.8	15.4
	Neither	22	13.8	14.1	29.5
	Agree	69	43.4	44.2	73.7
	Strongly Agree	41	25.8	26.3	100.0
	Total	156	98.1	100.0	
Missing	Don't Know	3	1.9		
Total		159	100.0		

AGGREGATE Economic Growth Always Harms the Environment (37)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	18	5.8	6.0	6.0
	Disagree	108	34.6	36.1	42.1
	Neither	71	22.8	23.7	65.9
	Agree	79	25.3	26.4	92.3
	Strongly Agree	23	7.4	7.7	100.0
	Total	299	95.8	100.0	
Missing	Don't Know	11	3.5		
	Missing Data	2	.6		
	Total	13	4.2		
Total		312	100.0		

While ¾ agree to strongly agree that environmental protection requires economic growth, only 42% disagree to strongly disagree that economic growth always harms the environment. Almost a third of the total sample agrees economic growth harms the environment. Further examination into the cognitive distinction between the two questions should be explored. Furthermore, while almost 50% of Prince George respondents disagreed with the statement "Economic growth always harms the environment", under 40% of Kelowna disagreed.

KELOWNA Economic Growth Always Harms the Environment (37)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	5.2	5.4	5.4
	Disagree	46	30.1	31.3	36.7
	Neither	30	19.6	20.4	57.1
	Agree	47	30.7	32.0	89.1
	Strongly Agree	16	10.5	10.9	100.0
	Total	147	96.1	100.0	
Missing	Don't Know	5	3.3		
	Missing Data	1	.7		
	Total	6	3.9		
Total		153	100.0		

PRINCE GEORGE Economic Growth Always Harms the Environment (37)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	10	6.3	6.6	6.6
	Disagree	62	39.0	40.8	47.4
	Neither	41	25.8	27.0	74.3
	Agree	32	20.1	21.1	95.4
	Strongly Agree	7	4.4	4.6	100.0
	Total	152	95.6	100.0	
Missing	Don't Know	6	3.8		
	Missing Data	1	.6		
	Total	7	4.4		
Total		159	100.0		

AGGREGATE Canada Economic Progress Will Slow Down (40)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	2.6	2.7	2.7
	Disagree	29	9.3	9.7	12.4
	Neither	25	8.0	8.4	20.8
	Agree	143	45.8	48.0	68.8
	Strongly Agree	93	29.8	31.2	100.0
	Total	298	95.5	100.0	
Missing	Don't Know	11	3.5		
	Missing Data	3	1.0		
	Total	14	4.5		
Total		312	100.0		

Similar to earlier questions about the relationship between the environment and the economy, almost 80% agree to strongly agree economic progress in Canada will slow down if the environment isn't better cared for. There is extremely little variation and it limits its use in other analyses. Only 9% of Prince George respondents disagreed while 17% of individuals in Kelowna held similar beliefs. Conceptually this is of interest to the body of theory that discusses the pro-environmental attitudes of forest workers. This seems to say that the more forest-dependent community is more environmental.

KELOWNA Canada Economic Progress Will Slow Down (40)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	2.6	2.8	2.8
	Disagree	20	13.1	13.8	16.6
	Neither	6	3.9	4.1	20.7
	Agree	69	45.1	47.6	68.3
	Strongly Agree	46	30.1	31.7	100.0
	Total	145	94.8	100.0	
Missing	Don't Know	6	3.9		
	Missing Data	2	1.3		
	Total	8	5.2		
Total		153	100.0		

PRINCE GEORGE Canada Economic Progress Will Slow Down (40)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	4	2.5	2.6	2.6
	Disagree	9	5.7	5.9	8.5
	Neither	19	11.9	12.4	20.9
	Agree	74	46.5	48.4	69.3
	Strongly Agree	47	29.6	30.7	100.0
	Total	153	96.2	100.0	
Missing	Don't Know	5	3.1		
	Missing Data	1	.6		
	Total	6	3.8		
Total		159	100.0		

8.4 Additional Data from Aggregate Sample

Know about MPB in BC (1)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nothing	17	5.4	5.5	5.5
	A little	171	54.8	55.0	60.5
	A fair amount	94	30.1	30.2	90.7
	A good deal	29	9.3	9.3	100.0
	Total	311	99.7	100.0	
Missing	Missing	1	.3		
Total		312	100.0		

A total of 85% know 'a little' to 'a fair amount' about the mountain pine beetle outbreak in the province.

Know about MPB manage in area (2)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nothing	66	21.2	21.3	21.3
	A little	174	55.8	56.1	77.4
	A fair amount	53	17.0	17.1	94.5
	A good deal	17	5.4	5.5	100.0
	Total	310	99.4	100.0	
Missing	Missing	2	.6		
Total		312	100.0		

Although 73% of the sample know 'a little' to 'a fair amount', 21% know nothing about how the mountain pine beetle outbreak is being managed in the area.

Density of Healthy Forest (8a)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Dense Stands of Trees	170	54.5	57.4	57.4
	Sparse Stands of Trees	51	16.3	17.2	74.7
	Density does not affect Forest Health	75	24.0	25.3	100.0
	Total	296	94.9	100.0	
Missing	Missing Data	16	5.1		
Total		312	100.0		

Variety in Healthy Forest (8b)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mostly the Same Type of Trees	40	12.8	13.2	13.2
	Mixed/different types of Trees	236	75.6	78.1	91.4
	Variation does not affect Forest Health	26	8.3	8.6	100.0
	Total	302	96.8	100.0	
Missing	Missing Data	10	3.2		
Total		312	100.0		

Openings in Healthy Forest (8c)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Large Openings Among Stands	66	21.2	22.1	22.1
	Small Openings Among Stands	173	55.4	58.1	80.2
	Opening Size Does Not Affect Forest Health	59	18.9	19.8	100.0
	Total	298	95.5	100.0	
Missing	Missing Data	14	4.5		
Total		312	100.0		

Although this variable can be seen as a means for measuring individual's knowledge of forest stand dynamics and forest health, the measure demonstrates a method of gauging cognitive preferences for forest types without the use of visualizations. In this way, it can be said that the majority of the sample prefer a mixed and dense forest with small (and assumably visual unobtrusive) openings. This response is not entirely unexpected and a body of literature devoted to examining aesthetics supports these findings. According to the literature, people prefer varied and natural landscapes. Large openings can be seen as the effects of human impacts, which diminish the 'naturalness' of these landscapes.

Support Genetically Engineered Reforestation (11)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Distrust Artificial Engineering	90	28.8	35.4	35.4
	Only In this Instance	77	24.7	30.3	65.7
	Whenever Appropriate	87	27.9	34.3	100.0
	Total	254	81.4	100.0	
Missing	Can't Decide	57	18.3		
	No Answer	1	.3		
	Total	58	18.6		
Total		312	100.0		

Considering the concerns voiced about genetic engineering in media, including genetically modified food cloning, it is no surprise that a substantial portion of responses oppose engineering. It is interesting to see that there is considerable support for genomic techniques to assist regeneration in this instance (30%).

Most Important to Protect (17)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	All Pine Species	97	31.1	36.5	36.5
	Local Biodiversity	99	31.7	37.2	73.7
	Local Business	5	1.6	1.9	75.6
	Forest Industry	60	19.2	22.6	98.1
	Recreation Opportunities	5	1.6	1.9	100.0
	Total	266	85.3	100.0	
Missing	Can't Choose	33	10.6		
	No Answer	13	4.2		
	Total	46	14.7		
Total		312	100.0		

Almost ¾ of the responses indicate individuals believe it is most important to protect the ecological values of the forest. However, could responses for 'all pine species' could be construed as a balanced response between the economic and ecological values, seen as preserving the current range of forest activities? Additionally, low responses in the economy and recreation opportunities categories may be a result of participants seeing those values as implicit in protecting either the forest industry (23%) as the former and local biodiversity (37%) in the latter.

Prince George responses show 69% prioritize protecting the pine forests and local biodiversity over leisure or economic values associated with the forests. But 27% believe the forest Industry needs to be protected above other values.

BC Mountain Pine Beetle Action Plan (20)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	31	9.9	12.9	12.9
	Disagree	103	33.0	42.7	55.6
	Neither	56	17.9	23.2	78.8
	Agree	41	13.1	17.0	95.9
	Strongly Agree	10	3.2	4.1	100.0
	Total	241	77.2	100.0	
Missing	Don't Know	65	20.8		
	Missing Data	6	1.9		
	Total	71	22.8		
Total		312	100.0		

Approximately 20% of individuals surveyed either did not know what the BC Mountain Pine Beetle Action Plan is or whether the government consulted the community. Over half of respondents disagreed in some form with the statement that "The BC government consulted the community sufficiently in the creation of 'British Columbia's Mountain Pine Beetle Action Plan 2005-2010'."

Industry Justify Clearcut Logging (21)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	30	9.6	10.5	10.5
	Disagree	85	27.2	29.6	40.1
	Neither	49	15.7	17.1	57.1
	Agree	88	28.2	30.7	87.8
	Strongly Agree	35	11.2	12.2	100.0
	Total	287	92.0	100.0	
Missing	Don't Know	19	6.1		
	Missing Data	6	1.9		
	Total	25	8.0		
Total		312	100.0		

Surprisingly, there is some scepticism and belief that industry is using the MPB as an excuse to justify clearcutting. A total of 39% agree to strongly agree that the MPB is being used to justify clearcut logging. However, nearly as many (37%) disagree to strongly disagree with this statement.

Increase Harvesting (22)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	12	3.8	4.2	4.2
	Disagree	31	9.9	10.7	14.9
	Neither	38	12.2	13.1	28.0
	Agree	151	48.4	52.2	80.3
	Strongly Agree	57	18.3	19.7	100.0
	Total	289	92.6	100.0	
Missing	Don't Know	17	5.4		
	Missing Data	6	1.9		
	Total	23	7.4		
Total		312	100.0		

Despite any scepticism seen in the previous question, the sample generally (72%) supports increasing levels of harvesting as the primary means of managing MPB.

Biofuel Processing Plant (25)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	8	2.6	3.1	3.1
	Disagree	32	10.3	12.4	15.5
	Neither	42	13.5	16.3	31.8
	Agree	134	42.9	51.9	83.7
	Strongly Agree	42	13.5	16.3	100.0
	Total	258	82.7	100.0	
Missing	Don't Know	54	17.3		
Total		312	100.0		

The impressive support (67%) for a biofuel processing plant provides evidence that communities may be receptive to planning alternative means to managing/using MPB wood. However, 17% of the sample responded as "don't know" which can either be attributed to their unfamiliarity with the meaning of biofuel or perhaps even with the specifics of where the plant would be. If the question was more detailed about what the function of biofuel/biomass was, the process, and the proximity/distance of the plant to individuals' houses, the response rate might have been higher.

Small Grants Are Necessary (28)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	1.6	1.7	1.7
	Disagree	29	9.3	10.1	11.9
	Neither	50	16.0	17.5	29.4
	Agree	140	44.9	49.0	78.3
	Strongly Agree	62	19.9	21.7	100.0
	Total	286	91.7	100.0	
Missing	Don't Know	21	6.7		
	Missing Data	5	1.6		
	Total	26	8.3		
Total		312	100.0		

Although the small variation in valid responses to this question limits its use as a variable in multivariate analysis, the responses towards this statement illustrates the support for a mechanism to mitigate the economic consequences of the mountain pine beetle. A total of 71% believe special assistance grants of some kind will be necessary to mitigate the problems associated with MPB.

Inclusion of First Nation Values (29)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	21	6.7	10.2	10.2
	Disagree	48	15.4	23.3	33.5
	Neither	54	17.3	26.2	59.7
	Agree	65	20.8	31.6	91.3
	Strongly Agree	18	5.8	8.7	100.0
	Total	206	66.0	100.0	
Missing	Don't Know	100	32.1		
	Missing Data	6	1.9		
	Total	106	34.0		
Total		312	100.0		

The high percent (32%) of respondents who don't know or don't have a sense of whether First Nations values are being included in decision-making both represents the relative lack of First Nations perspectives in this sample as well as presence in public discourse. The mean (3.05) further demonstrates the responses gravitate toward neither agreeing nor disagreeing with the statement.

Forests Will Adapt to MPB (30)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	57	18.3	20.9	20.9
	Disagree	96	30.8	35.2	56.0
	Neither	39	12.5	14.3	70.3
	Agree	70	22.4	25.6	96.0
	Strongly Agree	11	3.5	4.0	100.0
	Total	273	87.5	100.0	
Missing	Don't Know	38	12.2		
	Missing Data	1	.3		
	Total	39	12.5		
Total		312	100.0		

Though the conceptualization of this question is similar to question 23 (Forests will never fully recover), and where responses predominantly disagreed, the percentages here are opposite to expectations. This raises internal validity concerns. What does this mean when over 60% disagree with the statement that the forests will never fully recover and nearly 60 percent disagree with the statement that if left alone the forests will adapt to the mountain pine beetle? Does this measure something else? It is possible that the presence of the qualifying 'if left alone' is what people are responding to. That worded differently, "If managed, the forests will adapt to the MPB" may have the expected and similar response patterns to question 23.

Reduce Timber Extraction (31)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	20	6.4	7.4	7.4
	Disagree	73	23.4	27.0	34.4
	Neither	65	20.8	24.1	58.5
	Agree	93	29.8	34.4	93.0
	Strongly Agree	19	6.1	7.0	100.0
	Total	270	86.5	100.0	
Missing	Don't Know	39	12.5		
	Missing Data	3	1.0		
	Total	42	13.5		
Total		312	100.0		

Without any mention of the MPB, approximately 40% agreed "Timber extraction should be reduced to ensure a sustainable level of harvesting." However, 14% either didn't answer the question or "didn't know" and may see the issue as too technical a question to provide an opinion. A total of 34% disagreed with the statement which complements results from other questions on support for increased harvesting. However, this question is intended to separate pro-harvesting values from pro-environmental attitudes and on its predictive and face validity it seems to provide an adequate measure.

Forest Industry Was Previously More Important (32)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	21	6.7	7.3	7.3
	Disagree	76	24.4	26.3	33.6
	Neither	36	11.5	12.5	46.0
	Agree	119	38.1	41.2	87.2
	Strongly Agree	37	11.9	12.8	100.0
	Total	289	92.6	100.0	
Missing	Don't Know	22	7.1		
	Missing Data	1	.3		
	Total	23	7.4		
Total		312	100.0		

Although nearly half of the sample agree to strongly agree that the forest industry was more important previously than today, 34% disagree to strongly disagree. This result appears consistent with both populations although Prince George disagreed slightly more than Kelowna. Considering the sample size it is too difficult to accurately determine whether this difference is significant.

Biodiversity Increases Benefits to Communities (33)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	37	11.9	13.5	13.5
	Disagree	125	40.1	45.5	58.9
	Neither	47	15.1	17.1	76.0
	Agree	53	17.0	19.3	95.3
	Strongly Agree	13	4.2	4.7	100.0
	Total	275	88.1	100.0	
Missing	Don't Know	36	11.5		
	Missing Data	1	.3		
	Total	37	11.9		
Total		312	100.0		

Almost 60% disagree that forest biodiversity benefits only adjacent communities. In Prince George 25% agree that forest biodiversity only benefits local adjacent communities suggesting a quarter of the sample believes the consequence of biodiversity loss is of local concern only. Further investigation into the manner in which communities view biodiversity as locally versus globally significant could yield important implications for policy and governance. It could be that forest-based communities hold a protectionist view of the adjacent forests and do not want the interference of outside communities or policies restricting their use.

Culled from the General Social Survey, the following series of questions are in some cases amended to tailor wording for this survey. The repeated use of the questions analysis provides support for their validity and reliability in measuring environmental attitudes.

Modern Science Will Solve Our Problems (34)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	57	18.3	19.9	19.9
	Disagree	119	38.1	41.5	61.3
	Neither	60	19.2	20.9	82.2
	Agree	41	13.1	14.3	96.5
	Strongly Agree	10	3.2	3.5	100.0
	Total	287	92.0	100.0	
Missing	Don't Know	23	7.4		
	Missing Data	2	.6		
	Total	25	8.0		
Total		312	100.0		

A total of 61% disagree to strongly disagree that "modern science will solve our environmental problems with little change to our way of life."

Personally Too Difficult To Help Environment (38)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	57	18.3	18.9	18.9
	Disagree	170	54.5	56.3	75.2
	Neither	31	9.9	10.3	85.4
	Agree	35	11.2	11.6	97.0
	Strongly Agree	9	2.9	3.0	100.0
	Total	302	96.8	100.0	
Missing	Don't Know	9	2.9		
	Missing Data	1	.3		
	Total	10	3.2		
Total		312	100.0		

As much as ¾ of the sample disagree to strongly disagree that "It is just too difficult for someone like me to do much about the environment", lending some evidence to suggest policies promoting community recycling has lead to greater public awareness and empowerment. Although this variable is most often used to measure pro-environmental attitudes, here it can also be taken to mean the public is receptive to policies that initiate public involvement in adaptation strategies.

Environmental Threats are Exaggerated (39)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	65	20.8	22.6	22.6
	Disagree	122	39.1	42.4	64.9
	Neither	42	13.5	14.6	79.5
	Agree	47	15.1	16.3	95.8
	Strongly Agree	12	3.8	4.2	100.0
	Total	288	92.3	100.0	
Missing	Don't Know	22	7.1		
	Missing Data	2	.6		
	Total	24	7.7		
Total		312	100.0		

As much as 65% do not believe environmental threats are exaggerated. The results provide both evidence that impacts of the MPB outbreak as well as possibly other concerns like climate change issues are taken seriously. However, 20% still agree that "Many of the claims about environmental threats are exaggerated." Perhaps a bivariate analysis with the trust variables would show that those who agree with this question have significantly less trust for environmental groups. Based on some observed patterned responses, it would appear there is a group of possibly anti-environmentalists, though a more concentrated evaluation would need to validate this hypothesis.

9 Appendix C – The survey instrument

The University of British Columbia
Faculty of Forestry, Forest Resources Management
2nd Floor, Forest Sciences Centre
2045, 2424 Main Mall, Vancouver, B.C., V6T 1Z4

Consent to Participate in a Research Project

Project Title: *Public Perceptions of Mountain Pine Beetle Management*
Project Funding: This study is funded by Natural Resources Canada.

Project Investigators: Dr. Michael J. Meitner (office: 604-822-0029) and Daniel W. Berheide (office: 604-822-6708)

Consent: By signing this form, you agree to participate in a research project conducted by Dr. Michael J. Meitner and Daniel W. Berheide regarding your perception of forest management in and around the study area in BC, and your opinions relating to those simulated alternatives. First you will be asked to respond to a series of questions about your attitudes towards the Mountain Pine Beetle and related issues. In the second section, you will be asked to view images representing various forest management alternatives and to compare relationships among temporal flow of aesthetic, recreational and economic values associated with alternative management scenarios. Lastly, you will be asked to answer a standard battery of demographic questions.

You will participate in the research project, subject to the following conditions:

- You understand that all information associated with this study will be held in confidence and only the experimenter will have access to the information. Each subject will be assigned a number, and that number will be on all documents rather than his/her name. You have been assured that any data resulting from this experiment will be stored in a password protected computer database and that only a sequential generated ID number will be used to identify your responses.

- You understand that you may refuse to participate or withdraw at any time.

- If you have any questions or concerns about the procedures used in this research, Dr. Meitner or Mr. Berheide has agreed to answer any questions and inquiries that you may have.

If you have any questions or concerns about this research project, you may contact Dr. Mike Meitner (office: 604-822-0029) at the Faculty of Forestry, University of British Columbia. If you have any questions or concerns about your rights or treatment as research subjects, you may contact the UBC Office of Research Services and Administration at 604-822-8598.

Name (please print) _____ Signature: _____ Date: _____

This page of the survey will be detached from the questionnaire and the remaining portion of the survey assigned a unique random number to ensure the responses are not associated with any means for identifying its source of origin. (your name or identification).

Remember to please read the instructions carefully and thoroughly, some of the questions require you to circle your answer or check a box representing your choice while other questions ask you rank your preferences with numbers.

Indicate your answer clearly.

Please ask the staff member if you have any questions.

Varying with every individual, the survey should take between 15 and 20 minutes.

Remember all of your responses will be anonymous and answering all of the questions completely assist researchers understand how these complex issues impact individuals and communities.

As you may know, the recent outbreak of the mountain pine beetle (MPB) has raised serious forest management issues in British Columbia. The mountain pine beetle predominantly attacks mature lodgepole pine and approximately 80% of this species of trees in BC is predicted to die in the next 10 years. This survey asks your opinions about issues surrounding the current outbreak.

Please clearly circle the response that best represents your view.

1. How much would you say you know about the mountain pine beetle (MPB) outbreak in the province?
    a. Nothing
    b. A little
    c. A fair amount
    d. A good deal

2. How much do you know about how the mountain pine beetle (MPB) outbreak is currently being managed in your area?
    a. Nothing
    b. A little
    c. A fair amount
    d. A good deal

How much trust do you have in each of the following groups to give you correct information about the MPB? 1 hardly any, 2 not much, 3 some trust, 4 quite a lot, 5 great deal, 9 no answer

3. Forest industry ____
4. Environmental groups _____
5. Local and Provincial government_____
6. Media (Newspapers, TV, Radio, etc.) _____
7. University research centers _____

8. Pick an answer from <u>each</u> column that best describes your view of a healthy forest.

A healthy forest features:

Column I – Density	Column II – Variety	Column III - Openings
a. dense stands of trees	a. mostly the same type of trees	a. large openings among stands
b. sparse stands of trees	b. mixed/different types of trees	b. small openings among stands
c. density does not affect forest health	c. variation does not affect forest health	c. opening size does not affect forest health

9. Some experts argue that a necessary response to the mountain pine beetle (MPB) outbreak is to increase harvesting levels of all standing pine (including unaffected trees). Do you generally support more or less harvesting?

1	2	3	4	5
Less Harvesting		No Change		More Harvesting

10. It has been proposed that fertilizing trees could assist faster regrowth of stands. Would you support the use of fertilization?
    a. No
    b. Yes
    c. Can't make an informed decision

11. Would you support replanting genetically engineered species to regenerate the forest quicker and allow for a quicker return to standard harvesting levels? Or do you prefer reforestation occur without the use of genetically engineered species?
    a. I distrust any genetic engineering
    b. I support using genetically engineered species only in this instance (the MPB outbreak).
    c. I support using genetically engineered species whenever appropriate.
    d. Can't make an informed decision

12. Historically, pine has been the dominant species in areas affected by the MPB outbreak. It has been proposed that replanting mixed species would diversify the forest 'portfolio' therefore reducing further risk of future outbreaks. Would you rather replant the pine, replant with another single species (non-pine) or replant using a mix of forest species?
    a. Replant native pine species
    b. Diversify tree species
    c. Replant non-pine species only (e.g. spruce)
    d. Can't make an informed decision

13. It has been argued that salvaging more pine now will allow the forest to recover faster, get the most value from the timber resource, and employ more people in the short term. However, increased salvaging now will likely result in the elimination of many jobs in the future (15-20 years) after all of the affected pine has been cut and there is no more available mature pine to harvest. Additionally, unless other techniques can create diversity in the ages of the trees planted after salvaging, another MPB epidemic may occur. Would you support policies to increase the degree of salvaging timber now to remove more affected trees?
    a. Less salvaging
    b. No change in current level
    c. More salvaging
    d. Can't make an informed decision

14. Do you think that job growth in other industries (tourism, oil, mining, etc.) will replace possible future job losses in the forest industry?
    a. Not at all
    b. Only a small portion
    c. A small majority
    d. Almost completely
    e. Absolutely all
    f. Can't make an informed decision

15. Although the MPB is a part of the natural disturbance cycle of BC forests, some scientists have argued that the current extent of the outbreak is due to effects of temperature increases and global warming. Using a scale of 1 to 5, rate the degree to which humans are to blame where 1 means the extent of the outbreak is an anomaly in the natural cycle of disturbance ecology and 5 means people are largely to blame for the severity of the recent MPB outbreak.

1	2	3	4	5	8
The recent MPB outbreak is a natural anomaly.		Both		People are largely to blame for the recent outbreak of the MPB	Can't make an informed decision.

16. Who should be held primarily accountable for managing the MPB and its consequences for communities and forests?
    a. Government
    b. Private citizens
    c. Industry
    d. None of above

17. In addressing the MPB outbreak, which one of the following do you believe is most important to protect?
    a. All pine species
    b. Local biodiversity
    c. Local business
    d. The forest industry
    e. Outdoor recreation
    f. Can't choose

18. We hear a lot of talk these days about liberals and conservatives. Below is a seven-point scale on which the political views that people might hold are arranged from extremely liberal—point 1—to extremely conservative—point 7. Where would you place yourself on this scale?
    1. Extremely liberal
    2. Liberal
    3. Slightly liberal
    4. Moderate
    5. Slightly conservative
    6. Conservative
    7. Extremely conservative
    8. Can't choose

Please indicate whether you strongly disagree, disagree, neither agree nor disagree, agree, or strongly agree with each of the following statements by placing an (X) underneath the category that best describes your response.

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree	Don't know
19. The MPB is a natural part of forest ecology.						
20. The BC government consulted the community sufficiently in the creation of "British Columbia's Mountain Pine Beetle Action Plan 2005–2010."						
21. The MPB outbreak is being used by the forest industry to justify clearcut logging.						
22. Harvesting should be increased in infected areas to salvage larger volumes of timber.						
23. The level of disturbance caused by the MPB is irreversible and the forest will never recover fully.						

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree	Don't know
24. The local economy is strong enough to hold out through a shortage of logging activity.						
25. I would support the development of a biofuel processing plant in the local area.						
26. Due to the MPB, the wood products currently coming out of BC onto the global market will decrease in value.						
27. If the market value of wood products coming out of BC decreases in value, I will feel the economic impact as a result.						
28. Special assistance grants to my community to mitigate the environmental and economic consequences of the MPB are necessary.						
29. First Nations values are being considered in MPB management strategies.						
30. If left alone, the forest will adapt to the MPB.						
31. Timber extraction should be reduced to ensure a sustainable level of harvesting.						
32. Historically the surrounding forests were of greater importance to the local economy than they are today.						
33. Greater biodiversity in the forest increases benefits only to communities adjacent to the forest.						
34. Modern science will solve our environmental problems with little change to our way of life.						
35. We worry too much about the future of the environment and not enough about prices and jobs today.						
36. To protect the environment, British Columbia needs a strong economy.						

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree	Don't know
37. Economic growth always harms the environment.						
38. It is just too difficult for someone like me to do much about the environment.						
39. Many of the claims about environmental threats are exaggerated.						
40. Economic progress in Canada will slow down unless we look after the environment better.						

Briefly answer the following in the space provided below each question.

41. How do you believe the forest landscape has changed over the past 20 years?

42. How do you perceive the composition of the community has changed over the past 20 years?

43. What do you think contributed the most to the recent outbreak?

44. What will happen to your community if there is a decline in forest revenue?

This page describes the various policy scenarios seen in the associated images. The following page asks you to evaluate the images and should only take another few minutes.

Scenario comparison

In this section we would like you to evaluate 4 scenarios for dealing with the mountain pine beetle problem. In this evaluation we would like you to consider a number of factors simultaneously. These include: 1) how long until the beetle-damaged forest has recovered to a harvestable state, 2) the risk of the outbreak happening again, 3) the cost of the scenario, 4) the ecological effects of the scenario, 5) the resulting scenic beauty and 6) the potential of the area to support outdoor recreational activities. In scenarios 2, 3 and 4 the same amount of timber is harvested.

Scenario 1 - Do nothing (*refer to image set 1*)

In this scenario everything regenerates naturally according to whether it is a pure pine stand or a mixed stand. No trees are harvested and no treatments of any kind are applied to the forest. This scenario can be used as a baseline to compare the effects of the other scenarios against. The estimates of recovery time for this scenario range from 75-100 years.

Scenario 2 - Replant with pure pine (*refer to image set 2*)

Timber is harvested in this scenario and each area harvested is replanted. In this scenario pure pine is planted similar to the original composition of the existing forest. The estimates of recovery time for this scenario range from 65-75 years.

Scenario 3 - Replant with mixed species (*refer to image set 3*)

Timber is harvested in this scenario and each area harvested is replanted. In this scenario mixed species of trees are planted in an attempt to reduce the risk of future outbreaks. The estimates of recovery time for this scenario range from 70-80 years.

Scenario 4 - Replant with pure pine (fertilized) (*refer to image set 4*)

Timber is harvested in this scenario and each area harvested is replanted. In this scenario pure pine is planted similar to the original composition of the existing forest. In this case the trees are fertilized to help them to grow more quickly. The estimates of recovery time for this scenario range from 60-70 years.

A summary of this information is provided in the table below:

	Harvested	Cost	Recovery time	Risk of future outbreaks
Scenario 1 - Do nothing (*refer to image set 1*)	no	none	75-100	moderate
Scenario 2 - Replant with pure pine (*refer to image set 2*)	yes	moderate	65-75	moderate
Scenario 3 - Replant with mixed species (*refer to image set 3*)	yes	moderate	70-80	reduced
Scenario 4 - Replant with pure pine (fertilized) (*refer to image set 4*)	yes	high	60-70	moderate

Please rank order the scenarios in order of preference where 1 equals your most preferred and 4 equals your least preferred. Use each number only once.

	Rank 1 = most preferred 4 = least preferred
Scenario 1 - Do nothing (*refer to image set 1*)	
Scenario 2 - Replant with pure pine (*refer to image set 2*)	
Scenario 3 - Replant with mixed species (*refer to image set 3*)	
Scenario 4 - Replant with pure pine (fertilized) (*refer to image set 4*)	

Please rate which factors were most important to you in determining your scenario preferences. Check only one box on each line.

	Not Important	Somewhat Important	Important	Very Important	Extremely Important
Recovery time					
Cost					
Risk of future outbreaks					
Ecological effects					
Scenic beauty of the area					
Potential for outdoor recreation					

Should forest companies be harvesting more or less of the damaged wood than they currently plan to do?

Less harvesting		Neither		More harvesting

Please rank the scenarios for scenic beauty where 1 equals the most beautiful scenario and 4 equals the least beautiful. Use each number only once.

	Rank
Scenario 1	
Scenario 2	
Scenario 3	
Scenario 4	

Please answer these standard demographic questions. It will only take one minute.

1. In what year were you born? |__|__|__|__| YEAR

2. What is your gender?
   a. Male
   b. Female

3. What is your postal code? |__|__|__|__|__|__|

4. What is your marital status?
   a. Single (never married)
   b. Married
   c. Separated
   d. Divorced
   e. Widowed

5. How many children do you have under the age of 18 and still living at home with you? (If you don't have any children please put 0). _____

6. What is your occupation? (If you are not currently employed, specify whether you are unemployed, retired, homemaker or student). _____

   a. If you are unemployed or retired, what was your most recent job? _____

7. Circle the industry or sector you currently work in or worked in before you retired?
   a. Construction
   b. Education and Health Services
   c. Financial Activities
   d. Government
   e. Information
   f. Leisure and Hospitality
   g. Manufacturing
   h. Natural Resources and Mining
   i. Professional and Business Services
   j. Transportation and Utilities
   k. Wholesale and Retail Trade
   l. None

8. What is the highest level of education you have received?
   a. Part of primary school
   b. Completed primary school
   c. Part of high school
   d. Completed high school
   e. Some college or university
   f. Received a college or technical school certificate.
   g. Received a university bachelor's degree.
   h. Some postgraduate training.
   i. Received a postgraduate university degree.

9. Below are listed several categories of income. Please circle the category that gives the best estimate of your *personal income* before taxes last year.
   a. $0 to $9,999
   b. $10,000 to $19,999
   c. $20,000 to $29,999
   d. $30,000 to $39,999
   e. $40,000 to $59,999
   f. $60,000 to $79,999
   g. $80,000 to $99,999
   h. $100,000 and above
   i. Not applicable

10. Using the same categories would you please circle the category that gives the best estimate of your total *household income* before taxes last year
    a. 0 to $9,999
    b. $10,000 to $19,999
    c. $20,000 to $29,999
    d. $30,000 to $39,999
    e. $40,000 to $59,999
    f. $60,000 to $79,999
    g. $80,000 to $99,999
    h. $100,000 and above
    i. Not applicable

Thank you for your participation in this survey. If you have any questions, please contact:

Daniel W. Berheide
Research Assistant
M.Sc Candidate
University of British Columbia
(604) 822-6708

or

Dr. Michael J. Meitner
Assistant Professor
Department of Forest Resources Management
University of British Columbia
(604) 822-0029

Contact:

For more information on the Canadian Forest Service, visit our web site at:
cfs.nrcan.gc.ca

or contact the Pacific Forestry Centre
506 West Burnside Road
Victoria, BC V8Z 1M5
Tel: (250) 363-0600 Fax: (250) 363-0775
cfs.nrcan.gc.ca/regions/pfc

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